RCRA GROUND WATER QUALITY MONITORING REPORT 342 SURFACE IMPOUNDMENT HAZARDOUS WASTE MANAGEMENT UNIT, JANUARY - MARCH 1993

WHITTAKER CORPORATION, BERMITE DIVISION
22116 WEST SOLEDAD CANYON ROAD
SANTA CLARITA, CALIFORNIA 91350
AMV NO. WHI01.39
April 9, 1993

Prepared By

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April 9, 1993

Mr. Alan Sorsher, P.E. California Environmental Protection Agency Department of Toxic Substances Control 1405 North San Fernando Boulevard, Suite 300 Burbank, California 91504

WHI01.39

Subject: Area 342 RCRA Ground Water Quality Monitoring Report, January - March 1993

Whittaker Corporation, Bermite Division

Dear Mr. Sorsher:

In accordance with the RCRA Closure Plan for Whittaker Corporation, Bermite Division, enclosed is a copy of the Area 342 RCRA Ground Water Quality Monitoring Report, January - March 1993. This report presents the sampling and analysis results of those parameters analyzed both during this sampling event and all prior sampling events.

A statistical analysis of the indicator parameters (pH, specific conductance, total organic carbon (TOC), and total organic halogens (TOX)) analyzed in ground water samples collected from monitoring wells in Area 342 is presented in the enclosed report. The analysis compared the results of the downgradient monitoring wells to the upgradient (background) monitoring well. The statistical analysis does show a statistically significant difference between the downgradient and background wells at Area 342 for specific conductance, pH, and TOX. The geohydrology and geochemical characteristics as well as the variability of ground water quality underlying Area 342 are more fully discussed in the report of Additional Hydrogeologic Assessment of Area 342 Surface Impoundment submitted to Cal-EPA on December 14, 1992. As stated in the conclusions section of the December 14, 1992, report, we believe that the data presented in the report provide a demonstration pursuant to California Code of Regulations, Title 22, Section 66265.98 "that a source other than the regulated unit caused the evidence of a release or that the indication evidence resulted from error in sampling, analyses, or evaluation, or from natural variation in ground water, surface water, or the unsaturated zone."

Mr. Alan Sorsher, P.E. April 9, 1993 Page 2

If you have any questions regarding this report, please call me at (916) 939-7550.

Sincerely,

ACTON • MICKELSON • van DAM, INC.

Rarbara Mickelon

Barbara J. Mickelson, P.E.

President

BJM:mjd Enclosure

cc/enc: Mr. Edward Muller, Whittaker Corporation

Mr. Glen AbdunNur, Whittaker Corporation, Bermite Division

Mr. Tom Kelly, U.S. Environmental Protection Agency

Mr. Jim Ross, Los Angeles Regional Water Quality Control Board

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RCRA GROUND WATER QUALITY MONITORING REPORT 342 SURFACE IMPOUNDMENT HAZARDOUS WASTE MANAGEMENT UNIT JANUARY - MARCH 1993

WHITTAKER CORPORATION, BERMITE DIVISION 22116 WEST SOLEDAD CANYON ROAD SANTA CLARITA, CALIFORNIA 91350

1.0 INTRODUCTION

The Whittaker Corporation, Bermite Division (Whittaker) facility (site) is located at 22116 West Soledad Canyon Road in Santa Clarita, California (Figure 1). At the time operations were terminated in April 1987, Whittaker had interim status permits for 14 Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Units (HWMUs) at the site. A document entitled "Whittaker Corporation, Bermite Division, Santa Clarita, CA CAD064573108, Facility Closure Plan Modifications" (Closure Plan), was prepared by Whittaker and approved by the California Environmental Protection Agency, Department of Toxic Substances Control (Cal-EPA) and the U.S. Environmental Protection Agency (U.S. EPA) on December 28, 1987. Outlined in the Closure Plan are procedures for obtaining approval by Cal-EPA and U.S. EPA of clean closure certification for the different HWMUs, including the 342 Surface Impoundment (Area 342).

Required in the Closure Plan is the implementation of a ground water monitoring system at Area 342 capable of detecting and assessing the impact of the HWMU on the uppermost aquifer at the site. Implementation of a ground water monitoring system is described in the document entitled "Specific Plan for a Ground Water Quality Assessment Program for the 342 Surface Impoundment Area," dated September 12, 1991 (Area 342 Plan).

As part of the Area 342 Plan, a total of four ground water monitoring wells have been installed in and/or around Area 342. Monitoring well MW-2 was installed in December 1987 at a location estimated to be hydraulically downgradient (based upon local ground water elevation data) of the former 342 Surface Impoundment. Monitoring wells MW-7, MW-8, and MW-9 were installed during October through December 1991, with monitoring well MW-7 estimated to be located hydraulically upgradient from the former 342 Surface Impoundment and monitoring wells MW-8 and MW-9 estimated to be located hydraulically downgradient from the former 342 Surface Impoundment. The locations of the four monitoring wells are shown on Figure 2.

Ground water sampling activities were initiated on December 16, 1987, for monitoring well MW-2 and on January 30, 1992, for monitoring wells MW-7 through MW-9. The January - March 1993 ground water sampling event for Area 342 was conducted on January 27, 1993. The results of this sampling event are presented in this report, along with recommendations.

Documents submitted to Cal-EPA and U.S. EPA detailing RCRA clean closure activities for Area 342, including ground water quality monitoring, are listed in Appendix A. A document summarizing the installation of monitoring wells MW-7 through MW-9 was submitted to Cal-EPA and U.S. EPA in December 1992.

2.0 GROUND WATER LEVEL MEASUREMENTS

Water level measurements were reported to the nearest 0.01 foot on January 25, 1993, prior to well evacuation and sampling activities. Figure 3 graphically illustrates the historical potentiometric elevations derived from water level measurements collected from monitoring wells MW-2, MW-7, MW-8, and MW-9 since January 29, 1992. Table 1 summarizes the historical potentiometric elevations.

The water level elevation in monitoring well MW-2 increased 2.05 feet between October 19, 1992 and January 25, 1993. The water level elevation in monitoring well MW-2 has decreased 61.54 feet since the initiation of RCRA ground water monitoring activities in Area 342.

Water level elevations increased 1.76, 2.09, and 2.41 feet from October 19, 1992 to January 25, 1993, in monitoring wells MW-7, MW-8, and MW-9, respectively. Water levels have decreased 5.77, 5.39, and 5.06 feet in monitoring wells MW-7, MW-8, and MW-9, respectively, since measurements were initially obtained in January 1992.

A local ground water flow direction has been estimated using the potentiometric elevation data from January 25, 1993. Figure 2 illustrates the inferred potentiometric surface contours and an inferred ground water flow direction toward the west-northwest for January 25, 1993. Generally, similar inferred ground water flow directions were noted for the January 1992 through October - December 1992 sampling events.

Based upon the January 25, 1993 data, the location of monitoring well MW-7 is estimated to be hydraulically upgradient from Area 342, monitoring well MW-8 is estimated to be hydraulically cross-gradient/downgradient from Area 342, and monitoring wells MW-2 and MW-9 are estimated to be hydraulically downgradient of Area 342. Similar estimates were made for the January 1992 through October - December 1992 sampling events.

Ground water evacuation and monitoring well stabilization procedures are outlined in Appendix B.

3.0 GROUND WATER SAMPLE ANALYSES

3.1 Required Ground Water Analyses

As specified in the Area 342 Plan, the following analytical parameters were tested during the January - March 1993 ground water sampling event for Area 342:

- Indicator Parameters: pH, specific conductance, total organic carbon (TOC), and total organic halogens (TOX).
- Ground Water Quality Parameters: phenols, pesticides (endrin, lindane, methoxychlor, toxaphene, 2,4-D, and 2,4,5-TP), radium, gross alpha, gross beta, coliform bacteria, nitrate, sulfate, phosphate, sodium, chloride, fluoride, and dissolved metals (arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, and silver).
- Hazardous Constituent Parameters: volatile organic compounds (VOCs). semivolatile organic compounds (SVOCs), formaldehyde, and dissolved metals (antimony, copper, and thallium).

This suite of analytical parameters is the same as was tested during the initial four sampling events and the January 1992 sampling event conducted for Area 342 and represents the compounds which previously were identified as having potentially been used or stored in Area 342.

A modified, less extensive suite of analytical parameters for Area 342 was approved by Cal-EPA following submittal of "Quarterly Sampling Report No. 4." This modified suite of analytical parameters was similar to the original, with the exception that it excludes pesticides, radium, gross alpha, gross beta, coliform bacteria, phenols, fluoride, iron, manganese, formaldehyde, VOCs, and SVOCs. The modified suite of analytes was utilized for the fifth through thirteenth sampling events and the February 1992, March 1992, April 1992, July - September 1992, and October - December 1992 sampling events for Area 342.

All ground water samples collected as part of the January - March 1993 sampling event were submitted to FGL Environmental (FGL) in Santa Paula, California. FGL is certified by Cal-EPA to perform the ground water analyses outlined in the Closure Plan. Chain-of-custody and sample analysis request forms are included in Appendices C and D, respectively.

A description of FGL's Quality Assurance/Quality Control (QA/QC) program is provided in Appendix E. Copies of the original laboratory analytical reports for all trip, field, and method blanks, and duplicate and spiked samples analyzed by FGL are provided in Appendix F.

3.2 Approved Analytical Methods

Indicator, ground water quality, and hazardous constituent parameters were analyzed by U.S. EPA or other approved methodologies. Copies of the laboratory analytical method protocols were included in Appendix B of "Quarterly Sampling Report No. 1," dated December 1988.

A summary of sample volumes, sample containers, and laboratory analytical methods utilized during the January - March 1993 ground water sampling event is presented in Table B-3, Appendix B. Procedures regarding sample containers, sample labeling, sample collection, and field QA/QC are outlined in Appendix B.

4.0 GROUND WATER SAMPLE ANALYTICAL RESULTS

4.1 Indicator Parameters

Four replicate ground water samples from each monitoring well were analyzed for pH, specific conductance, TOC, and TOX to serve as indicator parameters. Table 2 summarizes the results of these analyses for the current and previous sampling events. Copies of the laboratory analytical reports for the indicator parameters are included in Appendix G.

Laboratory pH measurements of 6.8 to 6.9, 7.4, 7.1, and 6.9 to 7.0 were reported for samples collected from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively. The laboratory pH measurements reported for samples collected from the monitoring wells during the January - March 1993 sampling event were consistent with the measurements reported during previous sampling events.

Specific conductance measurements of 4,150 to 4,190, 767 to 775, 1,840 to 1,850, and 2,760 to 2,780 micromhos per centimeter (μ mhos/cm) were reported in samples from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively, for the current sampling event. The specific conductance measurements reported were consistent with measurements reported during previous sampling events.

A TOC concentration of <0.5 milligrams per liter (mg/l) was reported in the most recent samples collected from monitoring wells MW-2, MW-7, MW-8, and MW-9, and was consistent with the TOC concentrations reported in samples collected from the monitoring wells during previous sampling events.

Total organic halogen concentrations of 96 to 110, 9 to 18, 27 to 36, and 58 to 76 micrograms per liter (μ g/l) were reported in samples collected from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively, which were consistent with the TOX concentrations reported in monitoring well samples collected during previous sampling events.

4.2 Ground Water Quality Parameters

Laboratory analysis reported phenols, pesticides, and coliform bacteria at less than the respective detection limits in samples from the four monitoring wells, which is consistent with the results reported for the January 1992 sampling event. The January 1992 sampling event represents the only previous analysis of samples from monitoring wells MW-7 through MW-9 for the extended suite of analytes outlined in Section 3.1. January 1992 was the last sampling event where samples from monitoring well MW-2 were analyzed for this same extended suite of analytes. In addition, all dissolved metals tested were reported at less than the respective detection limits in samples collected from the four monitoring wells, except barium, which was reported at 610, 100, 260, and 330 μ g/l in samples from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively. The barium results were consistent with results reported during previous sampling events.

Analytical results for chloride, phosphorus, sulfate, fluoride, iron, manganese, nitrate, and sodium for the current and previous sampling events are presented in Table 3. Chloride concentrations ranged from 148 mg/l in the sample from monitoring well MW-7 to 1,240 mg/l in the sample from monitoring well MW-2. The chloride concentrations of samples from monitoring wells MW-7 and MW-9 were consistent with previous sampling events; whereas the chloride concentrations of samples from monitoring wells MW-2 and MW-8 were less than the previous sampling event (October - December 1992) but consistent with the initial five sampling events (January 1992 through July - September 1992). Phosphorus was reported at less than the detection limit for the samples from the four monitoring wells. Sulfate concentrations in samples ranged from <1 mg/l (monitoring well MW-8) to 9 mg/l (monitoring wells MW-2, MW-7, and MW-9). The phosphorus and sulfate results reported were generally consistent with the results reported for previous sampling events (January 1992 through October - December 1992).

Fluoride concentrations in samples ranged from 0.1 mg/l (monitoring wells MW-2 and MW-9) to 0.2 mg/l (monitoring wells MW-7 and MW-8). Iron concentrations in samples ranged from <0.05 mg/l (monitoring well MW-7) to 0.19 mg/l (monitoring well MW-8). Manganese was reported at less than the detection limit for the samples from all four monitoring wells. Nitrate concentrations in samples ranged from 2.2 mg/l (monitoring well MW-2) to 5.4 mg/l (monitoring wells MW-8 and MW-9). Sodium concentrations in samples ranged from 42 mg/l (monitoring well MW-7) to 90 mg/l (monitoring well MW-2). The fluoride, iron, manganese, nitrate, and sodium results were generally consistent with the results from the January 1992 sampling event.

Laboratory analysis reported gross alpha at 5 ± 4 , 2 ± 1 , 6 ± 3 , and 5 ± 3 picocuries per liter (pC/l) in samples from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively. Gross beta was reported at 6 ± 14 , 2 ± 2 , 0.3 ± 8 , and 4 ± 8 pC/l in samples from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively. Total radium was reported at 0.7 ± 1 , 0.6 ± 1 , 0.7 ± 1 , and 0.5 ± 1 pC/l in samples from monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively.

Copies of the laboratory analytical reports for the ground water quality parameters are included in Appendix G.

4.3 Hazardous Constituent Parameters

Laboratory analysis reported antimony, copper, and thallium at less than the respective detection limits in the samples collected from each of the four monitoring wells. Similar results were reported for antimony, copper, and thallium during the January through October - December 1992 sampling events. Additionally, formaldehyde and all VOCs and SVOCs were reported at less than the respective limits, which was consistent with the results from the January 1992 sampling event. Copies of the laboratory analytical reports for the hazardous constituent parameters are included in Appendix G.

5.0 STATISTICAL ANALYSIS

5.1 Assumptions Used in the Statistical Analysis

As recommended in the "RCRA Ground Water Monitoring Technical Enforcement Guidance Document," the data points that are less than the detection limit have been given a value equal to one-half the detection limit of the analyte.

Calculation of the comparison test statistic (t_c) was determined by following the procedure presented in 40 CFR 264, Appendix IV. The test statistic for the hydrogen ion concentration was calculated using a 0.05 level of significance for a two-tailed distribution, and the test statistics for the other parameters were calculated using a 0.05 level of significance for a one-tailed distribution. It was assumed that the data are distributed normally.

5.2 Data Preparation

The ground water sample analytical results from the background or upgradient monitoring well (MW-7) for all seven sampling events to date (January 1992 through January - March 1993) and the three downgradient monitoring wells (MW-2, MW-8, and MW-9) for the January - March 1993 ground water sampling event have been tabulated and prepared for statistical analysis. Four analytes have been used in the statistical analysis: pH, specific conductance, TOC, and TOX.

In accordance with the averaged replicate Students' t-test methodology used for this statistical analysis, the four indicator parameter analytical results, which are sampled and analyzed in quadruplicate in each sampling event (four replicates), are summarized by event for monitoring well MW-7. Four summary statistics have been calculated: arithmetic mean, standard

deviation, variance, and coefficient of variance. These replicate statistics have been calculated such that less than detection limit values are considered to have a value of one-half the detection limit and are presented in Table H-1, Appendix H.

The statistical analysis for the indicator parameters involves testing the null hypotheses regarding the ground water quality downgradient of Area 342, i.e., that there is no statistical difference between the average of all the sampling event statistics for each of the four indicator parameters for background monitoring well MW-7 compared to the January - March 1993 sampling event statistics for each of the downgradient monitoring wells (MW-2, MW-8, and MW-9).

The calculations of the average sampling event statistics were performed in the same manner as were the sampling event statistics. The t-statistics (t^* and t_c) were calculated as shown in 40 CFR 264, Appendix IV. The values of t_m and t_b were taken from the table included in 40 CFR 264, Appendix IV. An example calculation is included in Appendix H.

Note that the pH values have been transformed into their resulting hydrogen ion concentrations and that the values of t_m and t_b for the analysis of pH come from the two-tailed probability table.

5.3 Results

The averaged sampling event replicate results for each indicator parameter at each downgradient monitoring well were compared to the average first (January 1992) through seventh (January March 1993) sampling event replicate results for background monitoring well MW-7. The statistical analyses indicate that there are statistically significant differences in pH, specific conductance, and TOX between downgradient and background ground water quality.

6.0 SUMMARY

6.1 Ground Water Level Measurements

Based upon the January 25, 1993 data, the inferred direction of ground water flow was to the west-northwest. Based upon the January 25, 1993 data, monitoring well MW-7 was estimated to be located hydraulically upgradient of Area 342, monitoring wells MW-2 and MW-9 were estimated to be located hydraulically downgradient of Area 342, and monitoring well MW-8 was estimated to be located hydraulically downgradient or cross-gradient of Area 342. The ground water flow direction estimate for January 25, 1993, was generally similar to the estimates for the January 1992 through October - December 1992 sampling events.

6.2 Ground Water Sample Analytical Results

6.2.1 Indicator Parameters

The pH reported for the samples collected from the monitoring well estimated to be hydraulically upgradient from Area 342 (MW-7 at pH 7.4) was higher than the pH in samples collected from the monitoring wells estimated to be hydraulically downgradient or cross-gradient from Area 342 (MW-2 at pH 6.8 to 6.9, MW-8 at pH 7.1, and MW-9 at pH 6.9 to 7.1). The pH measurements reported for the samples collected from the four monitoring wells were consistent with pH measurements reported during previous sampling events.

The specific conductance reported for the samples collected from the monitoring well estimated to be hydraulically upgradient from Area 342 (MW-7 at 767 to 775 μ mhos/cm) was lower than the specific conductance in samples collected from the monitoring wells estimated to be hydraulically downgradient or cross-gradient from Area 342 (MW-2 at 4,150 to 4,190 μ mhos/cm, MW-8 at 1,840 to 1,850 μ mhos/cm, and MW-9 at 2,760 to 2,780 μ mhos/cm). The specific conductance measurements reported for the samples collected from the four monitoring wells were consistent with specific conductance measurements reported during the previous sampling events.

A TOC concentration of <0.5 mg/l was reported in samples collected from monitoring wells MW-2, MW-7, MW-8, and MW-9, which was consistent with the TOC concentrations reported during previous sampling events.

Total organic halogen concentrations for the samples collected from the monitoring well estimated to be hydraulically upgradient from Area 342 (MW-7 at 9 to 18 μ g/l) were less than the TOX concentrations in samples collected from the monitoring wells estimated to be hydraulically downgradient or cross-gradient from Area 342 (MW-2 at 96 to 110 μ g/l, MW-8 at 27 to 36 μ g/l, and MW-9 at 58 to 76 μ g/l). The TOX concentrations reported for the samples collected from the four monitoring wells were consistent with the TOX concentrations reported during previous sampling events.

6.2.2 Ground Water Quality Parameters

Laboratory analysis reported phenols, pesticides, coliform bacteria, and dissolved metals, except barium, at less than the respective detection limits in samples collected from all four monitoring wells. Barium was reported at 610, 100, 260, and 330 μ g/l in monitoring wells MW-2, MW-7, MW-8, and MW-9, respectively. These results were consistent with the results from previous sampling events.

The chloride concentration for the sample collected from the monitoring well estimated to be hydraulically upgradient from Area 342 (MW-7 at 148 mg/l) was lower than the chloride concentrations in samples collected from the monitoring wells estimated to be hydraulically

downgradient or cross-gradient from Area 342 (MW-2 at 1,240 mg/l, MW-8 at 471 mg/l, and MW-9 at 746 mg/l. The chloride concentrations of samples from monitoring wells MW-7 and MW-9 were consistent with the concentrations reported from previous sampling events; whereas the chloride concentrations of samples from monitoring wells MW-2 and MW-8 were less than the concentrations from the previous sampling event (October - December 1992) but consistent with the concentrations from the initial five sampling events (January 1992 through July - September 1992).

The phosphorus and sulfate results reported were generally similar to the results reported for previous sampling events (January 1992 through October - December 1992). The fluoride, iron, manganese, nitrate, and sodium results were generally consistent with the results from the January 1992 sampling event.

6.2.3 Hazardous Constituent Parameters

Laboratory analysis reported antimony, copper, and thallium at less than the respective detection limits, which was consistent with the results from previous sampling events. Additionally, formaldehyde and all VOCs and SVOCs were reported at less than the respective detection limits, which was consistent with the results from the January 1992 sampling event.

6.3 Statistical Analysis

The statistical analyses indicate that there are statistically significant differences in pH, specific conductance, and TOX between downgradient and background ground water quality.

The variability of ground water quality between the upgradient and downgradient monitoring wells in Area 342 was addressed further in the document summarizing the further hydrogeologic assessment of Area 342 entitled "Additional Hydrogeologic Assessment of the 342 Surface Impoundment Area submitted to Cal-EPA on December 14, 1992."

As stated in the conclusions section of the December 14, 1992 report, the data presented in the report provide a demonstration pursuant to California Code of Regulations, Title 22, Section 66265.98 "that a source other than the regulated unit caused the evidence of a release or that the indication evidence resulted from error in sampling, analyses, or evaluation, or from natural variation in ground water, surface water, or the unsaturated zone."

7.0 RECOMMENDATIONS FOR FUTURE GROUND WATER SAMPLING EVENTS

Based upon the data collected, current regulatory guidelines, and the professional judgment of AMV, the following recommendations are presented:

• With the approval of Cal-EPA, discontinue ground water monitoring activities at Area 342 and plug and abandon monitoring wells MW-2 and MW-7 through MW-9.

8.0 REMARKS/SIGNATURES

The recommendations contained in this report represent our professional opinions. These opinions are based on currently available information and were developed in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

TABLE 1

POTENTIOMETRIC SURFACE ELEVATIONS
AREA 342 GROUND WATER MONITORING WELLS
WHITTAKER CORPORATION, BERMITE DIVISION

Well No.	MW-2	MW-7	MW-8	MW-9
Top of Casing				
Elevation*	1,424.17	1,453.23	1,443.11	1,426.94
Date		Potentiometric St	ırface Elevations*	
12/23/87	1,104.11			
01/27/88				
02/03/88	1,104.62			
02/04/88	1,104.59			
02/05/88	1,104.56			
02/09/88	1,104.64			
02/10/88	1,104.67			
02/12/88	1,104.67			
02/19/88	1,104.50			
03/28/88	1,104.17			
04/05/88	1,104.09			
04/12/88	1,104.13			
04/19/88	1,104.05			
04/26/88	1,104.13			
05/02/88	1,105.05			
07/27/88	1,102.77			
10/03/88	1,098.12			
01/23/89	1,096.38	1		
04/17/89	1,093.89			
07/27/89	1,090.87			
08/10/89	1,090.29			
08/18/89	1,089.97			
10/30/89	1,088.79			
01/24/90	1,087.36			
04/16/90	1,085.40			
07/16/90	1,079.65			
10/17/90	1,076.29			
01/28/91	1,072.90			
04/22/91	1,066.77			
07/17/91	1,058.59			
10/08/91	1,050.17			
01/29/92	1,047.79	1,049.17	1,048.48	1,047.88
02/26/92	1,048.07	1,049.31	1,048.73	1,048.18
03/30/92	1,048.37	1,049.50	1,049.09	1,048.54
04/20/92	1,046.96	1,048.23	1,047.68	1,047.16
07/28/92	1,043.58	1,044.67	1,044.08	1,043.55
10/19/92	1,040.52	1,041.64	1,041.00	1,040.41
01/25/93	1,042.57	1,043.40	1,043.09	1,042.82

*NGVD = National Geodetic Vertical Datum (in feet).

TABLE 2

HISTORY OF INDICATOR PARAMETERS

AREA 342 GROUND WATER MONITORING WELLS

WHITTAKER CORPORATION, BERMITE DIVISION

Well	Date	Sampling Event	pН	Hydrogen Ion Concentration	Conductance (µmhos/cm)*	TOC ⁶ (mg/l) ^c	ΤΟΧ ⁴ (μg/l) ⁴
MW-2	10/04/88	1	6.8	1.58E-07	3,725	5	115
	10/04/88	i	6.8	1.58E-07	3,845	4	625
i	10/04/88	i	6.8	1.58E-07	3,644	6	250
	10/04/88	l i	7.0	1.00E-07	3,652	4	240
i	11/03/88	i	7.0	1.002-07	3,032	7	< 100
1	11/03/88	1 1			1		<100
- [7.0	1,005,07	2 952		
	01/25/89	2	7.0	1.00E-07	3,852	<3	120
1	01/25/89	2	7.0	1.00E-07	3,897	<3	130
	01/25/89	2	7.0	1.00E-07	3,897	4	110
	01/25/89	2	7.0	1.00E-07	3,897	<3	120
1	04/17/89	3	6.7	2.00E-07		3	135
	04/17/89	3	6.7	2.00E-07	ļ	4	110
	04/17/89	3	6.7	2.00E-07	ł	5	100
	04/17/89	3	6.7	2.00E-07	1	4	115
. !	07/27/89	4	6.9	1.26E-07	4,298	9	120
	07/27/89	4	6.8	1.58E-07	4,246	<3	125
Į.	07/27/89	4	6.7	2.00E-07	4,298	<3	100
i	07/27/89	4	6.9	1.26E-07	4,298	<3	100
1	10/31/89	5	7.0	1.00E-07	3,970	<3	< 100
- 1	10/31/89	5	6.9	1.26E-07	3,950	<3	< 100
	10/31/89	5	6.9	1.26E-07	4,050	<3	< 100
i	10/31/89	5	6.9	1.26E-07	4,040	7.8	< 100
i	01/25/90	6	6.7	2.00E-07	4,009	<3	< 100
	01/25/90	6	6.6	2.51E-07	4,069	<3	< 100
i	01/25/90	6	6.7	2.00E-07	4,069	<3	<100
	01/25/90	6	6.7	2.00E-07	3,917	<3	<100
	04/17/90	7	6.6	2.51E-07	3,665		70
- 1	04/17/90	7	6.6	1		<4	69
1	04/17/90	7		2.51E-07	3,695	<4	
		7	6.6	2.51E-07	3,658	<4	7:
1	04/17/90	1	6.7	2.00E-07	3,680	<4	74
l	07/17/90	8	7.6	2.51E-08	3,587	4	5
1	07/17/90	8	7.7	2.00E-08	3,587	4	5
j	07/17/90	8	7.8	1.58E-08	3,547	4	65
	07/17/90	8	7.8	1.58E-08	3,587	<4	5
- 1	10/18/90	9	6.8	1.58E-07	3,882	3.6	< 100
	10/18/90	9	6.8	1.58E-07	3,882	3.4	< 10
l	10/18/90	9	6.9	1.26E-07	3,882	3.7	< 10
1	10/18/90	9	6.8	1.58E-07	3,882	3.6	< 10
1	01/29/91	10	6.7	2.00E-07	3,990	4.7	8
1	01/29/91	10	6.7	2.00E-07	3,990	5.9	6
1	01/29/91	10	6.7	2.00E-07	3,990	1.3	7
ì	01/29/91	10	6.7	2.00E-07	4,000	1.4	7
i	04/23/91	11	7.0	1.00E-07	3,920	6.0	7
į	04/23/91	11	7.0	1.00E-07	3,930	5.7	7
	04/23/91	11	7.0	1.00E-07	3,930	4.7	8
	04/23/91	11	7.0	1.00E-07	3,930	4.9	8
ì	07/19/91	12	6.8	1.58E-07	3,920	6.6	65.
	07/19/91	12	6.8	1.58E-07	3,930	5.3	47
	07/19/91	12	6.8	1.58E-07	3,900	4.0	72
	07/19/91	12	6.8	1.58E-07	3,910	1.0	68
	10/09/91	13	7.0	1.00E-0	3,940	9.9	
	10/09/91	13	6.9	1.26E-07			6
	10/09/91	13	7.0	1	3,930	5	7
		1		1.00E-07	3,940	4	6
	10/09/91	13	7.0	1.00E-07	3,940	5.6	

TABLE 2 (continued)

HISTORY OF INDICATOR PARAMETERS AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Well	Date	Sampling Event	рΗ	Hydrogen Ion Concentration	Conductance (µmhos/cm) ^a	TOC ⁶ (mg/l) ^c	TOX ⁴ (μ g /l) ⁴
MW-2	01/30/92	01/92	6.8	1.58E-07	4,030	9.9	76.5
(continued)	01/30/92	01/92	6.8	1.58E-07	4,030	7.6	74.9
`	01/30/92	01/92	6.8	1.58E-07	4,030	7.0	76.6
	01/30/92	01/92	6.8	1.58E-07	4,030	5.5	73.9
l	02/27/92	02/92	6.9	1.26E-07	4,060	5.0	73.9
1	02/27/92	02/92	6.9	1.26E-07	4,060	2.9	88.3
	02/27/92	02/92	6.9	1.26E-07	4,060	2.8	75.6
i	02/27/92	02/92	6.9	1.26E-07	4,060	< 0.5	70.6
	03/31/92	03/92	6.7	2.00E-07	3,920	3.8	40.8
1	03/31/92	03/92	6.7	2.00E-07	3,930	3.1	42.9
i	03/31/92	03/92	6.7	2.00E-07	3,930	3.9	68.6
	03/31/92	03/92	6.8	1.58E-08	3,920	4.9	69.2
i	05/12/92	04/92	6.8	1.58E-08	4,100	< 0.5	75
Į.	05/12/92	04/92	6.8	1.58E-08	4,100	< 0.5	80
1	05/12/92	04/92	6.8	1.58E-08	4,100	< 0.5	73
l	05/12/92	04/92	6.8	1.58E-08	4,100	< 0.5	85
1	07/29/92	07/92-09/92	6.8	1.58E-08	4,150	6.7	80.7
i	07/29/92	07/92-09/92	6.8	1.58E-08	4,150	2.9	87.5
1	07/29/92	07/92-09/92	6.8	1.58E-08	4,150	< 0.5	18.3
	07/29/92	07/92-09/92	6.8	1.58E-08	4,140	<0.5	102
1	10/21/92	10/92-12/92	6.8	1.58E-08	4,090	3.9	80
1	10/21/92	10/92-12/92	6.8	1.58E-08	4,070	< 0.5	85
- 1	10/21/92	10/92-12/92	6.8	1.58E-08	4,070	< 0.5	83
i	10/21/92	10/92-12/92	6.8	1.58E-08	4,070	< 0.5	87
	01/27/93	01/93-03/93	6.9	1.26E-07	4,150	< 0.5	96
	01/27/93	01/93-03/93	6.9	1.26E-07	4,170	< 0.5	100
1	01/27/93	01/93-03/93	6.9	1.26E-07	4,170	< 0.5	93
	01/27/93	01/93-03/93	6.8	1.58E-08	4,190	< 0.5	110
MW-7	01/30/92	01/92	7.2	6.31E-08	734	< 0.5	7.2
1	01/30/92	01/92	7.2	6.31E-08	726	0.6	7.2
i	01/30/92	01/92	7.2	6.31E-08	722	0.7	9.0
	01/30/92	01/92	7.2	6.31E-08	729	0.6	11.7
į.	02/27/92	02/92	7.3	5.01E-08	734	<0.5	5.4
i	02/27/92	02/92	7.3	5.01E-08	734	< 0.5	5.7
	02/27/92	02/92	7.3	5.01E-08	736	< 0.5	5.5
	02/27/92	02/92	7.3	5.01E-08	735	< 0.5	6.3
1	03/31/92	03/92	7.2	6.31E-08	735	< 0.5	< 5.0
l	03/31/92	03/92	7.3	5.01E-08	736	<0.5	5.0
1	03/31/92	03/92	7.3	5.01E-08	738	<0.5	< 5.0
i	03/31/92	03/92	7.2	6.31E-08	735	<0.5	7.0
	04/21/92	04/92	7.2	6.31E-08	741	< 0.5	7.4
	04/21/92	04/92	7.3	5.01E-08	743	< 0.5	7.8
	04/21/92	04/92	7.3	5.01E-08	738	< 0.5	< 5.0
i	04/21/92	04/92	7.3	5.01E-08	737	< 0.5	<5.0
	07/29/92	07/92-09/92	7.3	5.01E-08	750	< 0.5	20.2
	07/29/92	07/92-09/92	7.3	5.01E-08	750	< 0.5	7.1
	07/29/92	07/92-09/92	7.3	5.01E-08	750	<0.5	<0.5
Ì	07/29/92	07/92-09/92	7.3	5.01E-08	760	< 0.5	37.5
	10/21/92	10/92-12/92	7.3	5.01E-08	778	< 0.5	7
1	10/21/92	10/92-12/92	7.3	5.01E-08	788	<0.5	7
	10/21/92	10/92-12/92	7.3	5.01E-08	782	< 0.5	14
	10/21/92	10/92-12/92	7.3	5.01E-08	782 784	<0.5	17
	01/27/93	01/93-03/93	7.4	3.98E-08	767	< 0.5	10
	01/27/93	01/93-03/93	7.4	3.98E-08	767	<0.5	
	01/27/93	01/93-03/93	7.4	3.98E-08	771		9
	01/27/93	01/93-03/93	7.4			< 0.5	17
1	01.21173	01/25-03/33	7.4	3.98E-08	775	< 0.5	18

TABLE 2 (continued)

HISTORY OF INDICATOR PARAMETERS AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Well	Date	Sampling Event	pН	Hydrogen Ion Concentration	Conductance (µmhos/cm) ^a	TOC* (mg/l)°	ΤΟΧ ⁴ (μg/l)*
MW-8	01/30/92	01/92	7.0	1.00E-07	2,130	0.9	65.5
	01/30/92	01/92	7.0	1.00E-07	2,130	1.1	52.8
	01/30/92	01/92	6.9	1.26E-07	2,140	1.1	59.7
	01/30/92	01/92	7.0	1.00E-07	2,130	< 0.5	43.6
i	02/27/92	02/92	7.0	1.00E-07	2,100	0.9	46.2
	02/27/92	02/92	7.1	7.94E-08	2,080	1.0	33.7
	02/27/92	02/92	7.1	7.94E-08	2,080	2.1	35.2
	02/27/92	02/92	7.1	7.94E-08	2,080	1.3	40.4
	03/31/92	03/92	7.0	1.00E-07	2,110	1.7	31.4
	03/31/92	03/92	7.0	1.00E-07	2,000	1.8	32.7
	03/31/92	03/92	6.9	1.26E-07	1,980	1.8	37.4
	03/31/92	03/92	7.0	1.00E-07	1,960	2.5	28.9
	04/21/92	04/92	6.9	1.26E-07	2,120	< 0.5	35.9
	04/21/92	04/92	7.0	1.00E-07	2,100	1.8	43.9
	04/21/92	04/92	6.9	1.26E-07	2,110	2.7	34
	04/21/92	04/92	6.9	1.26E-07	2,080	1.8	34.5
	07/29/92	07/92-09/92	7.0	1.00E-07	2,100	< 0.5	40.1
	07/29/92	07/92-09/92	7.0	1.00E-07	2,090	< 0.5	39.9
	07/29/92	07/92-09/92	7.0	1.00E-07	2,080	< 0.5	38.5
H	07/29/92	07/92-09/92	7.0	1.00E-07	2,080	< 0.5	55.4
ł	10/20/92	10/92-12/92	7.0	1.00E-07	2,060	< 0.5	39
ļ	10/20/92	10/92-12/92	7.0	1.00E-07	2,030	< 0.5	39
	10/20/92	10/92-12/92	7.0	1.00E-07	2,040	< 0.5	38
	10/20/92	10/92-12/92	7.0	1.00E-07	2,070	< 0.5	46
	01/27/93	01/93-03/93	7.1	7.94E-08	1,840	< 0.5	27
	01/27/93	01/93-03/93	7.1	7.94E-08	1,850	< 0.5	30
	01/27/93	01/93-03/93	7.1	7.94E-08	1,850	< 0.5	32
	01/27/93	01/93-03/93	7.1	7.94E-08	1,840	< 0.5	36
MW-9	01/30/92	01/92	6.9	1.26E-07	2,760	0.6	51.9
ll .	01/30/92	01/92	6.9	1.26E-07	2,770	1.1	61.7
	01/30/92	01/92	6.9	1.26E-07	2,780	1.0	51.9
	01/30/92	01/92	6.9	1.26E-07	2,760	3.1	58.3
	02/27/92	02/92	7.0	1.00E-07	2,780	2.7	43.7
	02/27/92	02/92	7.0	1.00E-07	2,780	2.2	49.5
	02/27/92	02/92	7.0	1.00E-07	2,790	< 0.5	54.9
1	02/27/92	02/92	7.0	1.00E-07	2,790	< 0.5	57.8
	03/31/92	03/92	6.9	1.26E-07	2,760	2.6	38.3
	03/31/92	03/92	6.9	1.26E-07	2,770	3.1	43.5
	03/31/92	03/92	6.9	1.26E-07	2,770	2.6	49.6
	03/31/92	03/92	6.9	1.26E-07	2,770	3.5	49.7
	04/21/92	04/92	6.9	1.26E-07	2,760	4.0	51.4
	04/21/92	04/92	6.9	1.26E-07	2,770	4.2	70.6
	04/21/92	04/92	6.9	1.26E-07	2,760	4.2	65.3
	04/21/92	04/92	6.9	1.26E-07	2,770	2.4	61.8
	07/29/92	07/92-09/92	6.9	1.26E-07	2,800	- < 0.5	88.9
	07/29/92	07/92-09/92	6.9	1.26E-07	2,800	< 0.5	68.9
	07/29/92	07/92-09/92	6.9	1.26E-07	2,800	< 0.5	78.1
	07/29/92	07/92-09/92	6.9	1.26E-07	2,800	0.74	78.4
,	10/21/92	10/92-12/92	6.9	1.26E-07	2,820	< 0.5	78
	10/21/92	10/92-12/92	6.9	1.26E-07	2,800	< 0.5	59
	10/21/92	10/92-12/92	6.9	1.26E-07	2,800	< 0.5	78
	10/21/92	10/92-12/92	6.9	1.26E-07	2,800	< 0.5	52
	01/27/93	01/93-03/93	6.9	1.26E-07	2,770	< 0.5	58
1	01/27/93	01/93-03/93	6.9	1.26E-07	2,760	< 0.5	76
	01/27/93	01/93-03/93	6.9	1.26E-07	2,780	< 0.5	60
	01/27/93	01/93-03/93	7.0	1.00E.07	2,770	< 0.5	66

^{*}Micromhos per centimeter.

Total organic carbon.

^eMilligrams per liter.

^{*}Total organic halogens.

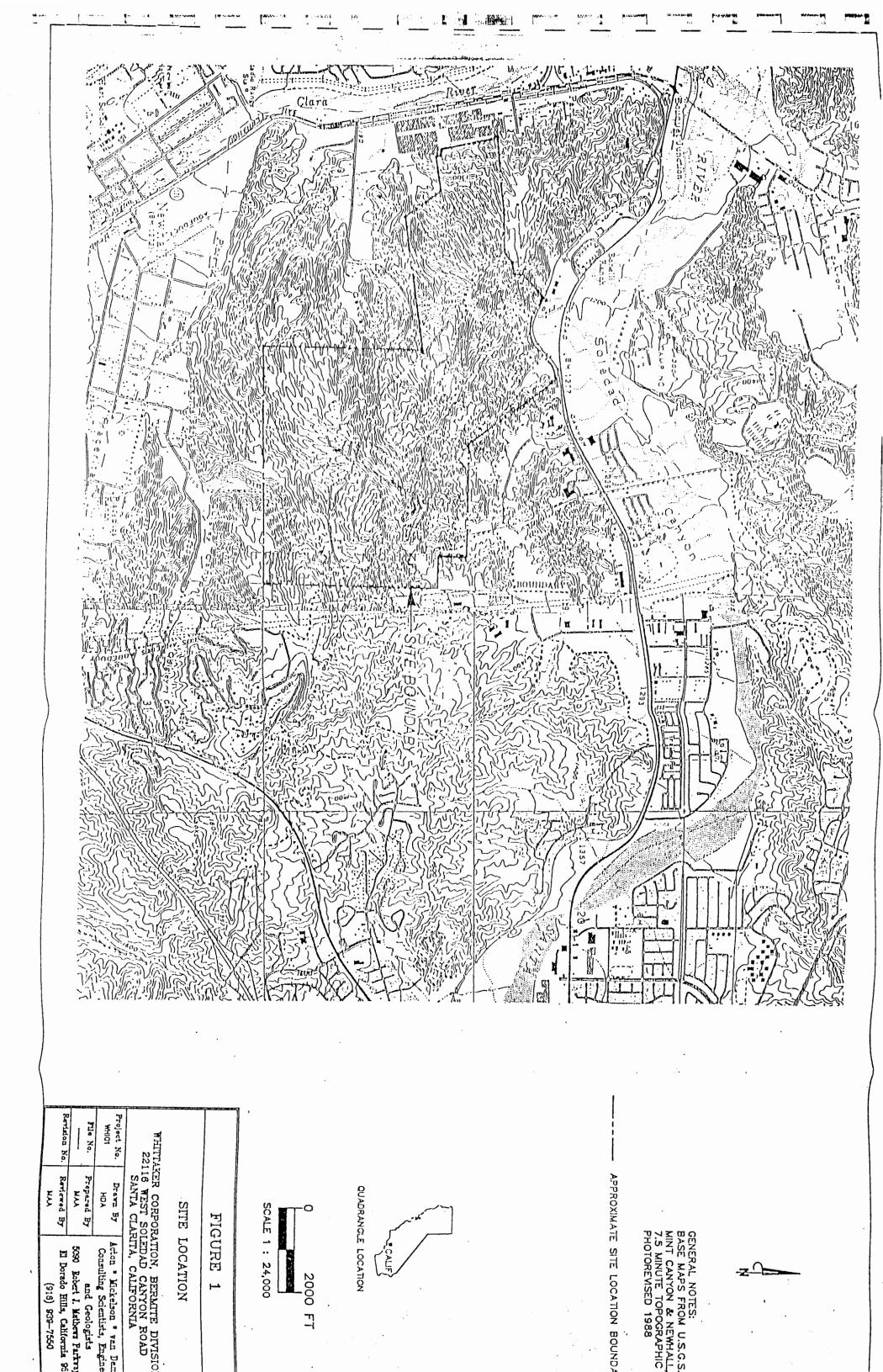
^{&#}x27;Micrograms per liter.

TABLE 3

NUTRIENT/MINERAL ANALYTICAL RESULTS
AREA 342 GROUND WATER MONITORING WELLS
WHITTAKER CORPORATION, BERMITE DIVISION
Concentrations in milligrams per liter (mg/l)

Well	Date	Sampling Event	Chloride	Phosphate-P	Sulfate	Fluoride	Iron	Manganese	Nitrate	Sodium
		Lvent	Ciliotide	r nospitate-r	Surrate	Fluoride	Hon	Manganese	Minaie	Soutuill
MW-2	01/30/92	01/92	1,330	< 0.1	14	0.1	< 0.05	< 0.03	3	86
	02/27/92	02/92	1,340	< 0.1	12	NA*	NA	NA	NA	NA
	03/31/92	03/92	1,250	< 0.1	14	NA	NA	NA	NA	NA
	05/12/92	04/92	1,380	< 0.1	9	NA	NA	NA	NA	NA
	09/09/92	07/92-09/92	1,358	< 0.1	12	NA	NA	NA	NA	NA
	10/21/92	10/92-12/92	1,920	< 0.1	9	NA	NA	NA	NA	NA
	01/27/93	01/93-03/93	1,240	< 0.1	9	0.1	0.06	< 0.03	2.2	90
MW-7	01/30/92	01/92	154	< 0.1	18	0.2	< 0.05	< 0.03	4	40
	02/27/92	02/92	163	< 0.1	16	NA	NA	NA	NA	NA
	03/31/92	03/92	145	< 0.1	16	NA	NA	NA	NA	NA
	04/21/92	04/92	153	< 0.1	14	NA	NA	NA	NA	NA
	09/09/92	07/92-9/92	133	< 0.1	17	NA	NA	NA	NA	NA
	10/21/92	10/92-12/92	165	< 0.1	16	NA	NA	NA	NA	NA
	01/27/93	01/93-03/93	148	< 0.1	9	0.2	< 0.05	< 0.03	3.2	42
MW-8	01/30/92	01/92	636	< 0.1	17	0.2	0.13	0.03	7	76
	02/27/92	02/92	627	< 0.1	14	NA	NA	NA	NA	NA
	03/31/92	03/92	585	< 0.1	14	NA	NA	NA	NA	NA
	04/21/92	04/92	581	< 0.1	12	NA	NA	NA	NA	NA
	09/09/92	07/92-9/92	598	< 0.1	15	NA	NA	NA	NA	NA
	10/21/92	10/92-12/92	861	< 0.1	13	NA	NA	NA	NA	NA
	01/27/93	01/93-03/93	471	< 0.1	<1	0.2	0.19	< 0.03	5.4	69
MW-9	01/30/92	01/92	837	< 0.1	17	0.1	0.16	0.04	6	70
	02/27/92	02/92	239	< 0.1	13	NA	NA	NA	NA	NA
	03/31/92	03/92	844	< 0.1	12	NA	NA	NA	NA	NA
	04/21/92	04/92	815	< 0.1	11	NA	NA	NA	NA	NA
	09/09/92	07/92-9/92	591	< 0.1	13	NA	NA	NA	NA	NA
	10/21/92	10/92-12/92	851	< 0.1	11	NA	NA	NA	NA	NA
	01/27/93	01/93-03/93	746	< 0.1	9	0.1	0.10	< 0.03	5.4	66

*NA = not analyzed.



QUADRANCLE LOCATION

Prepared By Randered By

Drawn By

SITE LOCATION

FIGURE

-

SCALE 1 : 24,000

2000 FT

AGH

Acton * Mickelson * van Dem Consulting Scientists, Engine and Geologists

5030 Robert I. Mathers Parkray
El Dorado Hills, California 95

(918) 939-7550

APPROXIMATE SITE LOCATION BOUNDA

GENERAL NOTES:
BASE MAPS FROM U.S.G.S.
MINT CANYON & NEWHALL,
7.5 MINUTE TOPOGRAPHIC
PHOTORENSED 1988

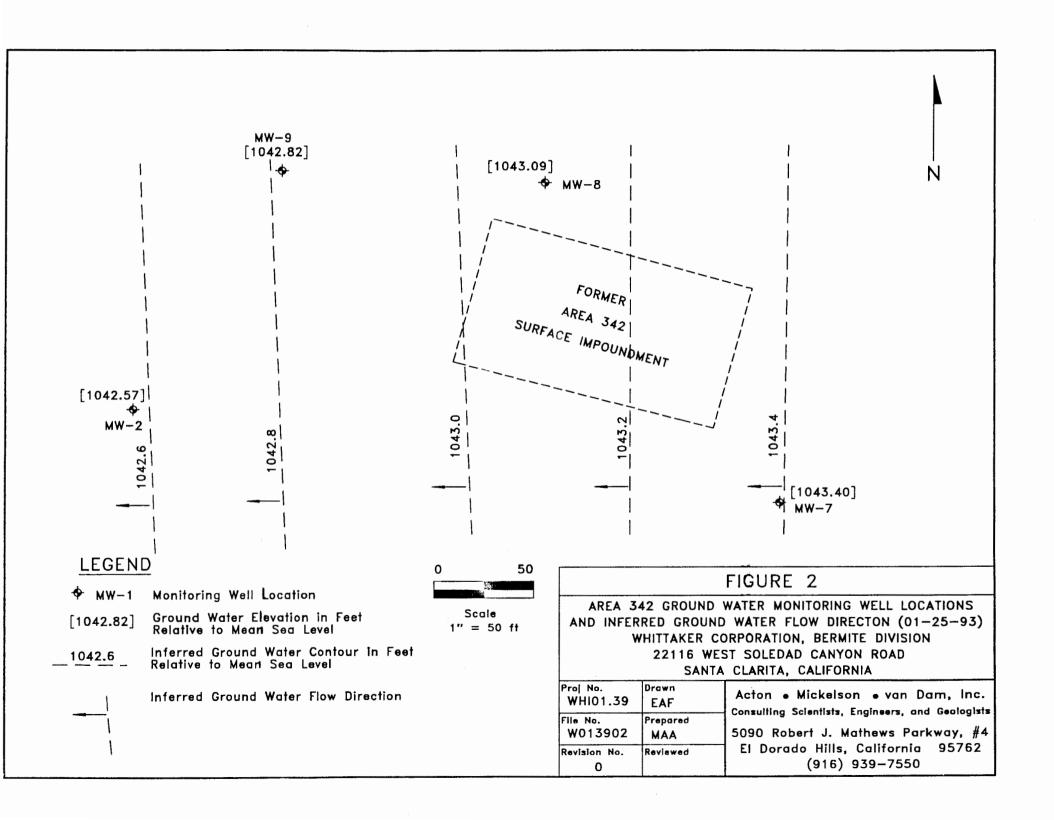
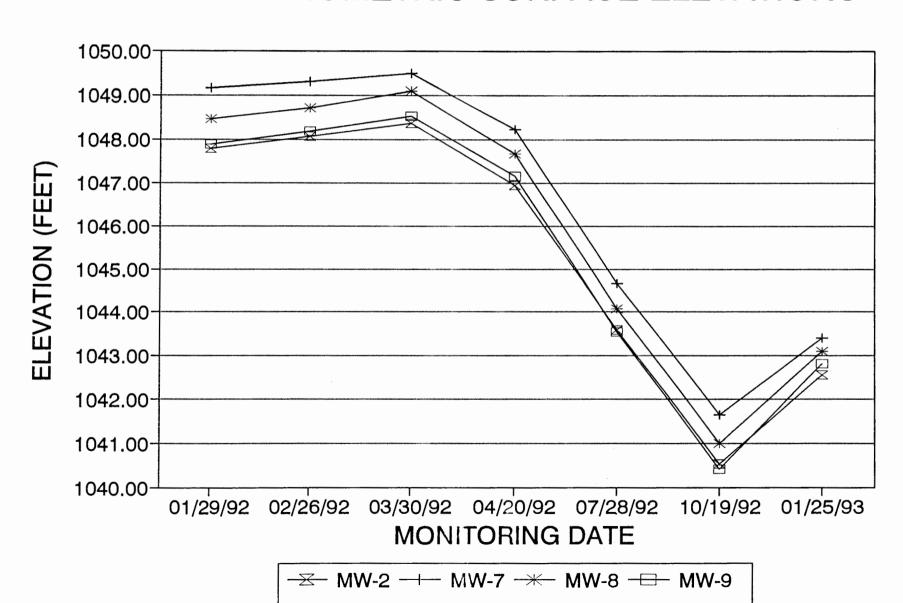


FIGURE 3

RCRA GROUND WATER MONITORING WELLS POTENTIOMETRIC SURFACE ELEVATIONS



APPENDIX A DOCUMENT SUBMITTAL CHRONOLOGY

APPENDIX A

DOCUMENT SUBMITTAL CHRONOLOGY

The following documents have been submitted to Cal-EPA and U.S. EPA, Region IX, in fulfillment of the Closure Plan regarding ground water monitoring at Area 342:

- Whittaker Corporation, Bermite Division, Santa Clarita, CA CAD064573108, Facility Closure Plan Modifications, April 1987.
- Revised Ground Water Monitoring Plan for the 317/342 Area, October 8, 1987.
- Proposed Interim Status Ground Water Monitoring Sampling and Analysis Program, December 1987.
- Documentation Report--Construction and Development of Wells for Ground Water Monitoring of the 342 and 317 Areas, February 1988.
- Verification Sampling Results at Selected RCRA Units, March 1988.
- RCRA Ground Water Monitoring System--Proposed Final Configuration, May 1988.
- Ground Water Sampling and Analysis Plan, August 1988.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 1, December 1988.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 2, March 1989.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 3, July 1989.
- Specific Plan for a Ground Water Quality Assessment Program, June 1989.
- Interim Response Action Plan, 317 Area Soil and Ground Water Remediation, June 1989.
- Site Ground Water Sampling and Analysis Plan, Appendix IV of 40 CFR 264.
- Statistical Analysis--Well MW-2 Versus MW-1 and MW-3, October 1989.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 5, March 1990.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 6, May 1990.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 7, June 1990.

- RCRA Ground Water Sampling, Quarterly Sampling Report No. 8, October 1990.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 9, January 1991.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 10, April 1991.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 11, July 1991.
- Specific Plan for a Ground Water Quality Assessment Program for the 317 Surface Impoundment Area.
- Specific Plan for a Ground Water Quality Assessment Program for the 342 Surface Impoundment Area.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 12, October 1991.
- RCRA Ground Water Sampling, Quarterly Sampling Report No. 13, January 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, January 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, February 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, March 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, April 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, July September 1992.
- Water Quality Monitoring and Response Plan for the Interim Status Area 342 Surface Impoundment, October 1992.
- Additional Hydrogeologic Assessment of the 342 Surface Impoundment Area, December 1992.
- RCRA Ground Water Quality Monitoring Report, 342 Surface Impoundment Hazardous Waste Management Unit, October December 1992.

APPENDIX B FIELD AND GROUND WATER SAMPLING

APPENDIX B

FIELD AND GROUND WATER SAMPLING PROCEDURES

WELL EVACUATION

On January 25, 1993, initial depth to water measurements were collected before monitoring well evacuation activities began. Operation of the pumps in the four monitoring wells was then initiated to evacuate stagnant water from these wells. Pumping durations to evacuate these four monitoring wells are summarized in Table B-1.

On January 25, 1993, prior to sample collection, the pumping rate for each monitoring well was reduced to approximately 100 milliliters per minute (ml/min) in a 1/4-inch-diameter tube.

In accordance with the "Ground Water Sampling and Analysis Plan," (Sampling Plan) dated August 1988, evacuated ground water from all four monitoring wells was discharged to the ground surface, downgradient from each monitoring well.

WELL STABILIZATION

Well stabilization measurements were periodically collected after well evacuation activities were initiated. Stabilization measurements for pH, temperature, and specific conductance were taken three times prior to sampling of each well to increase the likelihood that representative ground water samples were collected. Table B-2 presents a summary of stabilization measurements. As shown in Table B-2, the reported measurements in each monitoring well indicated a relatively stable condition prior to sampling.

SAMPLE CONTAINERS

Containers utilized for the collection of ground water samples were supplied by Eagle Picher Environmental Services and I-Chem, Inc. Sample container requirements are summarized in Table B-3. The sample containers utilized were washed by the suppliers in conjunction with the procedures set by U.S. EPA for quality controlled sample containers. Certificates of Analysis for the sample containers utilized during the ground water sampling event are provided at the end of this appendix.

SAMPLE LABELING

Sample identification labels were completed in the field at the time of sample collection in accordance with the Sampling Plan. The sample label designation system utilized is outlined in Table B-4. Each label identifies the monitoring well number, analytical parameter to be tested for, sampling date, and replicate number (if required).

SAMPLE COLLECTION

Sampling Volumetric Flow Rate

A Teflon sampling valve and stem were installed into the invert of the well discharge pipe of each monitoring well to minimize aeration and agitation of the collected ground water sample. The flow rates in the monitoring wells were reduced to approximately 100 ml/min in a 1/4-inch-diameter tube prior to sampling.

Order of Sample Collection

The order in which ground water samples were collected at each monitoring well is presented in Table B-5. The ground water from each monitoring well was sampled for the specified analytical parameters in the same sequence.

Field Sample Preservation

Ground water samples collected for dissolved metals were filtered through an in-line, 0.45 micron filter, manufactured by Instrumentation Northwest, Inc. These filters are designed for dissolved metals analysis of ground water samples and are not reused between samples or monitoring wells. A 50 percent nitric acid solution was added to the sample containers following filtration of the ground water sample to lower the pH. The pH of the water sample was monitored with an electric pH meter as the acid was added with a small pipette. Acid was added until a pH <2 was achieved.

Following collection, labeling, and sealing, each individual ground water sample was placed in a refrigerator and locked. On January 27, 1993, the samples were placed on ice in a cooler and delivered to the laboratory.

Field and Trip Sample Blanks

The trip blanks were prepared in the analytical laboratory, transferred to the site in coolers, stored in a refrigerator overnight, transferred to each sampling location during sampling activities, stored with collected ground water samples throughout the sampling event, and delivered to the laboratory.

The field blanks are prepared in the field using water provided by the analytical laboratory. The field blanks, once prepared, were stored with the ground water samples throughout the sampling event and delivered to the laboratory.

FIELD QA/QC

Washing of Field Test Equipment

To minimize the potential for cross-contamination between well samples, field equipment used during sampling activities was washed between each well. This procedure involved washing and rinsing with deionized water before and after each sample was collected at each well. The mercury thermometer, pH probe, nitric acid eye droppers, specific conductance probe, and water level meter probe were all washed between samples.

Unused sampling gloves were worn by sampling personnel prior to sealing the sample containers with the chain-of-custody seals.

Sample Container Labeling and Seals

As previously stated, the sample containers were labeled in the field as each sample was collected. A unique sample identification number was assigned to each ground water sample. Chain-of-custody seals were then placed on the sample containers after sampling and labeling. The ground water samples were placed on ice in a cooler, and chain-of-custody seals were placed on the cooler prior to shipment to the laboratory.

Chain-of-Custody and Sample Analysis Request Forms

Chain-of-custody forms were filled out at the time of sample collection and were kept with the samples until they were delivered to the laboratory. Copies of the signed chain-of-custody forms are provided in Appendix C.

Sample analysis request forms were also filled out at the time of sample collection and were kept with the samples until they were delivered to the laboratory. Sample analysis request forms are used to inform the laboratory of the analysis to run on each ground water sample. Copies of the sample analysis request forms are provided in Appendix D.

Delivery of Samples to Laboratory

Ground water samples were delivered to FGL in Santa Paula, California, by a Whittaker employee after sampling activities were completed. FGL is approximately 45 minutes by car from the site. Maximum and minimum thermometers were placed in each cooler for temperature verification. Upon arrival at the laboratory, the temperature was recorded on the sample analysis request form. The temperature of the samples was kept below 4 degrees Celsius.

Security

Security measures were implemented to minimize the likelihood that unauthorized personnel had access to the wells or ground water samples before, during, or after sampling activities. The site is fenced-in with locking gates and has 24-hour security personnel present. Each monitoring well has a locking cap to deter unauthorized access to the well. The ground water samples were handled by Whittaker personnel only during sampling activities and delivery to FGL.

TABLE B-1

WELL EVACUATION RECORD AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Well Number	Date Pump Started	Evacuation Approximate Duration of Pumping (hours)	Sampling* Duration of Pumping (hours)	Time and Date of Sample Collection
MW-2	01/26/93	24	4.17	1210 (01/27/93)
MW-7	01/26/93	24	2.75	1045 (01/27/93)
MW-8	01/26/93	24	3.25	1115 (01/27/93)
MW-9	01/26/93	24	3.75	1145 (01/27/93)

^{*}Flow rate from wells was reduced prior to sampling. Actual sample extraction flow rate for all wells approximately 100 milliliter/minute in a 1/4-inch pipe.

TABLE B-2 WELL STABILIZATION TESTS AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Well	Temperature (° C.)	pН	Specific Conductance (µmhos/cm) ^a	Time and Date	Turbidity (NTU) ^b
MW-2	22.2	7.25	4,070	1250 (01/26/93)	0.51
	22.0	7.00	4,150	1550 (01/26/93)	0.37
	21.4	6.87	4,090	0750 (01/27/93)	0.28
MW-7	22.2	7.56	742	1235 (01/26/93)	7.30
	22.1	7.00	760	1535 (01/26/93)	3.65
	21.3	7.44	763	0735 (01/27/93)	3.85
MW-8	22.2	7.53	1,507	1240 (01/26/93)	33.8
	22.0	7.02	1,665	1540 (01/26/93)	17.70
	21.4	7.14	1,818	0740 (01/27/93)	4.85
MW-9	21.9	7.45	2,680	1245 (01/26/93)	6.82
	21.8	6.84	2,730	1545 (01/26/93)	5.85
	21.2	7.05	2,760	0745 (01/27/93)	3.62

 $^a\mu mhos/cm = micromhos per centimeter.$ $^bNTU = Nephelometric Turbidity Units.$

TABLE B-3

LABORATORY ANALYTICAL METHODS AND SAMPLE VOLUME AND CONTAINER REQUIREMENTS AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Constituent	Analytical Method	Sample Volume (milliliters)	Container Type
Indicator Parameters			
pH	EPA 150.1	50	Plastic/glass
Specific Conductance	EPA 120.1	100	Plastic Plastic
Total Organic Carbon	EPA 9060	250	Amber glass-TFE cap
Total Organic Halogen	EPA 9020	250	Amber glass-TFE cap
Ground Water Quality Parameters			
Nitrate	EPA 353.2	100	Plastic/glass
Sulfate	EPA 375.4	200	Plastic/glass
Sodium	EPA 6010	200	Plastic
Iron	EPA 6010	200	Plastic
Manganese	EPA 6010	200	Plastic
Phosphorus	EPA 365.4	100	Plastic/glass
Fluoride	EPA 340.2	100	Plastic/glass
Chloride	SM 407C	100	Plastic/glass
Arsenic	EPA 7060	100	Plastic
Barium	EPA 6010	100	Plastic
Cadmium	EPA 7131	100	Plastic
Chromium	EPA 7191	100	Plastic
Lead	EPA 7421	100	Plastic
Mercury	EPA 7470	200	Plastic/glass
Selenium	EPA 7741	100	Plastic Plast
Silver	EPA 7761	100	Plastic
Formaldehyde	EPA 8315	100	Plastic
Bacteria	SM 17ed	100	Plastic
Radium	EPA 900.1	1,000	Plastic
Gross Alpha	EPA 900.0	1,000	Plastic
Gross Beta	EPA 900.0	1,000	Plastic
Hazardous Constituent Parameters			
Volatile Organic Compounds	EPA 624	3 x 40	Amber glass-TFE cap
Base Neutral/Acids	EPA 625	3 x 1,000	Amber glass-TFE cap
Pesticides	EPA 505/515.1	3 x 1,000	Amber glass-TFE cap
Antimony	EPA 7041	100	Plastic
Copper	EPA 6010	100	Plastic
Thallium	EPA 7841	100	Plastic
	2111 /011	100	1 143110

TABLE B-4

KEY TO ANALYSIS DESIGNATION LABELS ON SAMPLE CONTAINERS AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

Analysis Designation	Parameter(s) to be Analyzed
Α	pH Specific Conductance (temperature corrected)
В	Total Organic Carbon (TOC)
С	Total Organic Halogen (TOX)
D	Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-D, and 2,4,5-TP
E	Radium, Gross Alpha, Gross Beta
F	Coliform Bacteria
G	Phenols
н	Sulfate, Chloride, Sodium, Iron, Manganese, Nitrate
I	Total Phosphate
К	Dissolved Metals: Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Thallium
M	Dissolved Silver
N .	Fluoride
О	Volatile Organics
P	Semivolatile Organics
Q	Formaldehyde

Each sample container was labeled with a unique sample number. The form of each label was as follows:

Well I.D./Analysis Designation/Sample Event No./Replicate No.

Where:

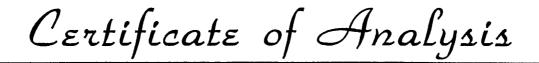
Well I.D. = MW-2, MW-7, MW-8, or MW-9. Analysis Designation = A through O according to above table. Sample Event No. = 1 through present event number. Replicate No. = 1 through 4.

Note: Absence of replicate number indicates that replicate samples were not required.

TABLE B-5

ORDER OF SAMPLE COLLECTION AREA 342 GROUND WATER MONITORING WELLS WHITTAKER CORPORATION, BERMITE DIVISION

1	Volatile Organics
2	Semivolatile Organics
3	Total Organic Halogen (TOX)
4	Total Organic Carbon (TOC)
5	Phenols
6	Endrin, Lindane, Metoxychlor, Toxaphene, 2,4-D, 2,4,5-TP
7	pH, Specific Conductance
8	Radium, Gross Alpha, Gross Beta
9	Coliform Bacteria
10	Dissolved Metals
11	Silver (Dissolved)
12	Nitrate, Sulfate, Sodium, Iron, Manganese, Chloride
13	Fluoride
14	Total Phosphate
15	Formaldehyde



Bottle Type & QA Level: C Level 1

Description

: 1 Liter White HDPE

Lot No.: C1162020

Date: 6-14-91

METALS QUALITY CONTROL ANALYSIS

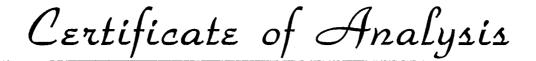
This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

Compound Analyzed Quantity Found (ug/L) Silver..... Aluminum.....<100 Arsenic..... Barium..... Beryllium..... Cadmium..... Chromium.... <10 Cyanide..... Mercury..... <5 Selenium.... Vanadium.....

Approved: Jul Shepher of Date : 6-14-91



ENVIRONMENTAL SERVICES



Bottle Type & QA Level: L Level 1

Description

: 500 mL. White HDPE

Lot No.: L1110010

Date: 4-28-91

METALS QUALITY CONTROL ANALYSIS

This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

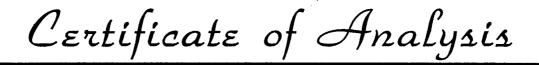
Compound Analyzed Quantity Found (ug/L)

Silver <	10
Aluminum	00
Arsenic <	. 5
Barium	20
Beryllium	5
Calcium<10	
	<1
	10
	10
Copper	10
	10
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Iron	
•	. 2
Potassium	
Magnesium	20
	10
Sodium (Polyethylene)<10	00
	20
	<2
	< <u>5</u>
	<2
	10
	10
	20
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	EU

Approved: Jul Shepherd (1)
Date 4-28-91



**ENVIRONMENTAL SERVICES** 



Bottle Type & QA Level: C Level 1

Description

: 1 Liter White HDPE

Lot No.: C1162020

Date: 6-14-91

METALS QUALITY CONTROL ANALYSIS

This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

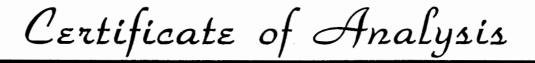
## Compound Analyzed Quantity Found (ug/L) Barium..... Beryllium.... < 5 Cadmium.... Cobalt...., Cyanide..... Mercury.... Lead.... Antimony....Selenium.... <5 <10

Approved: Jul Shepher d

Date : 6-14-91

EAGLE PICHER

**ENVIRONMENTAL SERVICES** 



Bottle Type & QA Level: C Level 1

Description

: 1 Liter White HDPE

Lot No.: C1162020

Date: 6-14-91

METALS QUALITY CONTROL ANALYSIS

This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

## Compound Analyzed Quantity Found (ug/L) Silver..... Barium.... Beryllium.... Calcium.....<100 <10 Chromium.... Cyanide..... Mercury.... <20 Lead..... <5 Thallium.... <10

Approved: Jul Shepherd (3)
Date: 6-14-91



**ENVIRONMENTAL SERVICES** 



A Member of the Specialty Materials Division, Eagle-Picher Industries, Inc.

## Level II Certification

Eagle-Picher level II bottles have been washed in conjunction with the procedures set by the EPA for quality-controlled sample containers.

### Wash Procedure A

- Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- Rinsed three times with distilled water.
- 3. Rinsed with 1:1 mitric acid.
- 4. Rinsed three times with ASTM-Type 1 organic-free water.
- 5. Cven-dried for one hour.
- 6. Rinsed with hexane.
- 7. Oven-dried for one hour.

Verified by:



## Level II Certification

Eagle-Picher level II bottles have been washed in conjuction with the procedures set by the EPA for quality-controlled sample containers.

#### Wash Procedure A

- Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- 2. Rinsed three times with distilled water.
- 3. Rinsed with 1:1 nitric acid.
- 4. Rinsed three times with ASTM-Type 1 organic-free water.
- 5. Oven-dried for one hour.
- 6. Rinsed with hexane.
- 7. Oven-dried for one hour.

Verified by Jul Shepherd



A Member of the Specialty Materials Division, Eagle-Picher Industries, Inc.

## Level II Certification

Eagle-Picher level II bottles have been washed in conjunction with the procedures set by the EPA for quality-controlled sample containers.

#### Wash Procedure A

- Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- Rinsed three times with distilled water.
- 3. Rinsed with 1:1 nitric acid.
- 4. Rinsed three times with ASTM-Type 1 organic-free water.
- 5. Oven-dried for one hour.
- 6. Rinsed with hexane.
- 7. Oven-dried for one hour.

Verified by:



A Member of the Specialty Materials Division, Eagle-Picher Industries, Inc.

## Level II Certification

Eagle-Picher level II bottles have been washed in conjuction with the procedures set by the EPA for quality-controlled sample containers.

### Wash Procedure A

- 1. Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- 2. Rinsed three times with distilled water.
- 3. Rinsed with 1:1 nitric acid.
- 4. Rinsed three times with ASTM-Type 1 organic-free water.
- 5. Oven-dried for one hour.
- 6. Rinsed with hexane.
- 7. Oven-dried for one hour.

Verified by:

(is,

A Member of the Specialty Materials Division, Eagle-Picher Industries, Inc.

## Level II Certification

Eagle-Picher level II bottles have been washed in conjunction with the procedures set by the EPA for qualitycontrolled sample containers.

#### Wash Procedure A

- Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- Rinsed three times with distilled water.
- 3. Rinsed with 1:1 mitric acid. -
- Rinsed three times with ASTM-Type 1 organic-free water.
- Cven-dried for one hour. Rinsed with hexane.
- 7. Oven-dried for one hour.



A Member of the Specialty Materials Division, Eagle-Picher industries, Inc.

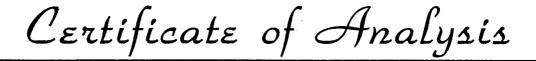
### Level II Certification

Eagle-Picher level II bottles have been washed in conjunction with the procedures set by the EPA for qualitycontrolled sample containers.

#### Wash Procedure A

- Bottles, liners, and caps washed in laboratory-grade, non-phosphate detergent.
- Rinsed three times with distilled water.
- 3. Rinsed with 1:1 nitric acid.
- Rinsed three times with ASTM-Type 1 organic-free water. Cven-dried for one hour.
- 6. Rinsed with hexane.
- 7. Oven-dried for one hour.





Bottle Type & QA Level: L Level 1

Description

: 500 mL. White HDPE

Lot No.: L1110010

Date: 4-28-91

METALS QUALITY CONTROL ANALYSIS

This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

### Compound Analyzed

## Quantity Found (ug/L)

Silver	(10
	100
	۲.5
Barium •	<20
Beryllium	<.5
	100
Cadmium	<1
	<10
	<10
	<10
Cyanide	<10
	100
Mercury	<.2
	100
	100
	<10
	100
	<20
	<b>\</b> 20
Lead	
Antimony	<5
Selenium	<2
	<10
	<10
	<20
£111W++++++++++++++++++++++++++++++++++	20

Approved: Jul Shepherd (1)



**ENVIRONMENTAL SERVICES** 

# APPENDIX C CHAIN OF CUSTODY FORMS

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14/19/11	11	1156		X		1		1								11	F
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# FRUIT GROWERS LABORATORY, Inc.

# 9301262 CHAIN-OF-CUSTODY

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Sample Location/Description Date Sampled Sampl
1 SP 300437-1 1/27/93 0903 G I G MW - >
2 1-2 1 1231 11 1
3 -3 0837 1
4 -4 0958
5 -5 031
6 -6 1106
7 -7 1136 )
8 4 -8 1,203 94 9
Rush results due by:  Relinquished by: Date: Time:  Received by: Date: Time:  Received by: Date: Time:  Received by: Date: Time:  Received by: Date: Time:
rinal sample disposition:
Lab disposal: Return to Client: Date of ret.: _/_/_

TAMER BUILDING



# FINUIT GROWERS LABORATORY, INC.

# 9301262 CHAIN-OF-CUSTODY

Phone: Fax:  Project Contact Sampler Comp sa Time: Purchas QA/QC r	## FGL  FGL	/Time: No Date Sampled	Time Sampled	Type of Sample: Composite(C) Grab (G)	_	Type of Containers: (8)Brass (V) VOA (G) Glass (P) Plastic	(S) Soil (SL)Sludg	(SW) Surface Water (MW) Monitoring Well (GW) Ground Water (TB) Travel Blank (WW) Wastewater (S) Spike (DW) Drinking Water	(P) Potable (NP) Mone Potable	Preservative:NaHSO4, HCL, H2SO4, HNO3, pH <2 NaOH pH > 9 or pH > 12 ; Na2S2O3 if chlorinated Other	X Formaldelylle								Sample Condition: Temperature (L) Leaking, (B) Broken (HS) VOA Headspace	Custody Seal((Y)) (N)
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FAS GOSTER BLOCK

# **ANALYTICAL CHEMISTS**

# LABORATORY TESTING SUBMISSION FORM

Client: FGL Our Lab No.: <u>8P 300437</u>
Person submitting sample: <u>Gina Kolakowski</u>
Laboratory sample is being submitted to: CLAYTOW)
Date Mailed: 1128/93 Shipped Via: UPS NEXT DAY AIR
Number of samples being submitted: 9 Solid: Liquid:
RUSH YES NO If yes, date needed by:
Type of analyses to be performed:
FORMALDEHYDE

*** LABORATORY - Attached is a confirmation of receipt, please answer questions and PLEASE RETURN TO US AS SOON AS POSSIBLE ***

# APPENDIX D SAMPLE ANALYSIS REQUEST FORMS

Sampling Inform	ation		. •				342	AREA
Project No. <u>\$5</u>	-01.4	Pr	oject	Name:	BERM	ITE 7		
Sampler Name: 🤄	LEN ABRUN-NUR	Z/TIM BRICK	R	Tele	. No.	(805)	259-	224/
Name of Person	Receiving	Samples:	Je	anin	e F	gnes		
Date Samples Re	sceived: _	1/27/93	3	· · · · · · · · · · · · · · · · · · ·			·	
Internal Temper	cature of S	Sample Cor	ntainer	: <u>0</u>	6	<del> </del>		
Notes on Sample	es:							
				Analy	sis F	Requir	ed	
,			PHENNES SEMINOCS	SULPHATE CITCORIDE	TOTAL GHOSPHARE	TO DISS. HERES CA /SILVER	FLOOKIDE	404634 40c/5
Sample I.D.	Laborato	ry I.D.						
MW2/0,P/7	300	439	×					
MW7/ H/7				X				
MW2/I/7					X			
MU2/K/M/7				-		X		
MW2/N/7							X	
mu2/0/7								X
MW7/0P/7	300	443	X					
M47/H/7				X				
MW7/H/7 MW7/I/7					X			
Mw7/K,M17						X		
MW7/N/7		,					×	
. /- 17		7						$\sim$

Sampling Inform	nation				34	2 AR	EA
	T-01.4 Pr						
Sampler Name: (	FLEN ABRUNNUR/TIMBRICK	er.	Tele	. No.	(805)	259-	<del>2</del> <del>2</del> 4 1
Name of Person	Receiving Samples:	Je	anin	e F	gner	_	
	eceived: 1/27/						
Internal Tempe	rature of Sample Con	tainer	::	0°			
Notes on Sampl	es:					<del></del> -	
			Analy	ysis :	Requir	ed	
		PHEC	Toc	701	3-10 2,457P SILVEX ENDLINDTEN	RAPINOM GROSS AT 1114	COLIFORM
Sample I.D.	Laboratory I.D.						
MW2/A/7/1-4	300439	$\times$					
MW2/B/7/1-4			X				
MW2/c/7/1-4				X			
MW2/0/7					X		
MW2/E/7						X	
MW2/F/7	$\bigvee$						X
MW7/A/7/1-4	300443	X					
MW7/B/7/-4			X				
MU:710/7/1-4				X			
MW7/D/7					X		
MW71E/7						X	
115/7							X

Sampling Information				HREA 342						
Project No. <u>8</u>	•							,		
Sampler Name: $\in$	NEW ABOUN	- NOR TIM	BREK	Tele	. No.	<u>(505)</u>	259	-224		
Name of Person	Receiving	Samples:	Je	anine	e E	gnes				
Date Samples Re	ceived: _	1/27/93	3							
Internal Temper	rature of	Sample Cor	ntaine	r:	J°					
Notes on Sample	es:		·		<del></del>					
			Analysis Required							
·			PH, EC	700	70X	3-40 2,457 SILVEX GUD LUP. TOXA CUD LUP. TOXA	RAMON GROSS MAIN	COLIFORM BACTERIA		
Sample I.D.	Laborate	ory I.D.								
muela/7/1-4	300	:444	×							
mue/8/7/1-4				×						
mwelc/7/1-4					$\rightarrow$					
unsid/1/						X				
MNE/E/7							X			
mw8/F/7								$  \times  $		
mug/a/1/1-4	300	445	8							
mug181/1-4				X						
mug/8/1/1-4					$\mid \times \mid$					
mw9/0/7						X				
MW9/E/7							X			
-ici 2								X		

ARDA 342

Sampling Inform	ation				4-4				
Project No. <u>85</u>	5-01-4	Project	Name:	Bern	17E /	CHR.	y WATER		
	EN ABON-NUR TIM						- 2241		
	Receiving Samples:		anin	e E	Igne-				
	ceived: 1/27	•							
Internal Temper	ature of Sample Co	ontainer	s:(	)°		<del> </del>			
Notes on Sample	:S:	·	<del></del>						
			Analysis Required						
		PHENOLS SEMI VOCS	SULPHATE	TOTAL PHCSPHATE	DISS METALS	FLAURIDE	EPA 624 VOCS		
Sample I.D.	Laboratory I.D.								
Mue/6,2/7	300444	X							
muelil7			X						
MWE/I/7				<u> </u>					
mme/km/7					X				
MW8/N/7						X			
mue/0/7							X		
mw9/6.8/7	30445	X							
mw9/4/7			×						
mwgiT17				X					
MW9/K.M/7					$\times$				
MW9/N/7	/					X.			
musicin							$  \times  $		

317 MREA 342 AREA

Sampling Informati	on				4 JAREA
Project No. <u>85-01.</u>	<u>4</u> Pro	oject Na	me: <u>BER</u>	MITE QTI	177 6 7777. 1264. Shiplus e
Sampler Name: Glav.	ABON-NUR/TINBRICKE	T	ele. No.	(805) 7	59-2241
Name of Person Rec	eiving Samples: .	Jean	nine E	gnes_	
Date Samples Recei					
Internal Temperatu	re of Sample Con	tainer:	_0°		
Notes on Samples:					
		λr	alysis	Required	i
		FORMACOEHIDE			
		12		<u> </u>	
Sample I.D. La	aboratory I.D.				
MW1/3/18	301A31	X			
mu2/0/7		V			
MW3/Q/18		X			
MW5/Q/18		X			
Mub/0/18		X			
MW7/Q/7		X			
MU8/a/7		X			
Mc49/a/7		X			
MW9/a/7 MW10/a/18		X			
				-	

# APPENDIX E LABORATORY QA/QC PROGRAM



# ANALYTICAL CHEMISTS

# Quality Assurance Manual



Corporate Offices & Laboratory
P.O. Box 272/853 Corporation Street
Santa Paula, CA 93061-0272
TEL: (805) 659-0910
FAX: (805) 525-4172

Office & Laboratory 2500 Stagecoach Road Stockton, CA 95215 TEL: (209) 942-0181 FAX: (209) 942-0423

Field Office Visalia, California TEL: (209) 734-9473 Mobile: (209) 738-6273

# ANALYTICAL CHEMISTS

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- Table V-3 Quality Control Acceptance Criteria for Radio Chemical Methods
- Table V-4 BFB Key Ion Abundance Criteria
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- Figure VI-3 FGL Department of Health Services Certificate

## I. Introduction

FGL, Inc. (FGL Environmental) has been serving California industries and governmental agencies on a continually expanding basis since 1925. Office and laboratory facilities are located in both Santa Paula and Stockton. FGL maintains a field office in the Visalia area to serve clients in the central and southern portions of the San Joaquin Valley. A field staff is available in all areas for the collection of samples. Through the use of the most modern instrumentation available and a highly qualified staff, FGL is capable of providing a broad range of organic, inorganic, toxicity, radioactivity and microbiological analyses on waters, wastewaters, soils and hazardous waste materials.

The purpose of this manual is to define and provide instructions for the quality assurance program used by FGL Environmental for its analytical laboratory operations. The objectives of the program are to control, assess, and document the quality of analytical data generated by FGL Environmental. The program achieves these objectives through two functions: (1) providing quality control data that can be used to determine analytical precision and accuracy and (2) controlling data quality within acceptance limits.

This manual identifies laboratory methods published by the U.S. Environmental Protection Agency and other authorities. It describes the quality control procedures to be used with the methods. It describes the overall approach used by FGL Environmental to ensure that the objectives of its QA/QC program are met. If necessary, more detailed procedures can be prepared on a project-specific basis.

# II. Organization and Responsibilities

A). Laboratory Personnel Darrell H. Nelson, B.S. John Quinn, Ph.D. Steven D. Castellano, M.S. Dudley S. Jayasinghe, Ph.D. Ricardo Sandoval, B.S. Kurt Wilkinson, B.S. Tiekang Huang, M.S. Thomas Bartanen, M.S. Neil Jessup, B.S. Scott Bucy, B.S. Eric Cotting, M.S. Uday Y. Sathe, M.S. Juan Manuel Magana, B.S. Jeanine Egner, B.S. Santos Marquez, B.A. Michel Franco, B.A. L. Burns

President/Lab Director-Santa Paula Vice President/Lab Director-Stockton Quality Assurance Director-Santa Paula Technical Director/Chemist - Santa Paula Ag Lab Manager - Santa Paula Inorganic Lab Manager-Santa Paula Technical Director - Stockton Quality Assurance Officer - Stockton Agronomist - Visalia Agronomist - Santa Paula Computer Systems Mgr. - Santa Paula Environmental Chemist - Santa Paula

#### B). Minimum Qualifications:

Title: Chemist - B.S./B.A. degree in chemistry or closely related discipline, i.e. biology, environmental science, etc.

Title: Technician - No degree required. Training for tasks such as sample preparation and routine physical and chemical measurements must have been completed and documented by a qualified chemist. All laboratory work is to be supervised and reviewed by a qualified chemist.

## C. Staff Background and Qualifications

Darrell H. Nelson

President/Lab Director-Santa Paula

Education:

B.S. (1970) in Soil and Water Science University of California, Davis.

Oualifications:

Mr. Nelson is the chief executive officer of the corporation, FGL, Inc. His previous experience relating to analytical chemistry includes five years of work as a bench chemist and supervisor of several major projects involving field sampling,

laboratory analyses and report

preparation. Mr. Nelson has been employed

by FGL, Inc. since 1970.

John Quinn

Vice President - Lab Director - Stockton

Education:

B.A. (1965) in Chemistry, St. Peter's College

C.Ph.1. (1972) in Organic Chemistry,

U.C.L.A.

Ph.D. (1973) in Organic Chemistry,

U.C.L.A.

Qualifications:

Dr. Quinn is Vice President of the corporation, FGL, Inc. His previous experience includes supervision of major projects in the field of hazardous waste involving laboratory analyses, personnel assignment, client relations and report preparation. Dr. Quinn is currently serving as manager of the Stockton facility

for the corporation.

Steven D. Castellano

Quality Assurance Director - Santa Paula

Education:

B.S. (1987) in Soil Science

California Polytechnic State University

San Luis Obispo

M.S. (1990) in Soil Chemistry Oregon State University, Corvallis

Qualifications:

Mr. Castellano spent three years as a research assistant at the Soil Science Dept. of Oregon State University. He was in charge of several projects, all involving field sampling, analytical chemistry, computer applications, and

technical report writing.

Dudley S. Jayasinghe

Technical Director - Santa Paula

Education:

Ph.D. in Analytical Chemistry with minor in organic chemistry and physical chemistry Oregon State University, Crovallis B.S. in Organic Chemistry minor in physics University of Peradeniya, Sri Lanka

Oualifications:

Mr. Jayasinghe is presently working as Technical Director at FGL Environmental. He has done post-doctoral research on soil chemistry at the Department of Soil Science at Oregon State University. He has been research assistant in the Department of Chemistry, Oregon State University. He has done research on the absorption transport of organic pollutants in the environment. This includes analytical method development for the trace analysis of organic compounds. He was a teaching assistant in the Department of Chemistry at Oregon State University. He taught undergraduate and graduate courses analytical instrumentation, quantitative general chemistry. and analysis includes research supercritical and electrochemical extraction methods of organic compounds. detection was research officer in the processing research division of the Coconut Sri Lanka, Research Institute in and products analysis on food performed made out of coconut.

Ricardo Sandoval

Ag Lab Manager - Santa Paula

Education:

B.S. (1985) in Crop Science & 2 Year Technical Degree in Fruit Science University of California, San Luis Obispo

Qualifications:

Mr. Sandoval has six years experience using Flame Atomic Absorption, Inductively Coupled Argon Plasma, and Technicon Auto Analyzers for agricultural testing of soil and plant tissue samples.

Kurt Wilkinson

Inorganic Lab Manager - Santa Paula

Education:

B.S. (1987) Biochemistry

California Polytechnic State University

San Luis Obispo

Qualifications:

Mr. Wilkinson has over five years

experience including agricultural testing of soil, plant tissue and food products as well as environmental testing of drinking water, wastewater, hazardous waste and airs. His most recent experience was managing a trace metals department for an environmental testing facility. Performing personnel assignment client and consultation on analysis needs and data interpretation. He is familiar with federal, state, and local inorganic testing

procedures and QA/QC requirements.

Tiekang, Huang

Technical Director - Stockton

Fducation:

B.S. in Chemistry (1982) M.S. in Chemistry (1987)

M.S. in Environmental Chemistry (1989)

Oualifications:

Mr. Huang has many years of experience in Environmental Analytical Chemistry using Flame AA and Graphite Furnace AA for various metal analyses, GC for volatile organics in water and soil and GC/MS for hazardous organics in wastewater according

to EPA Methods.

Thomas Bartanen

Environmental Chemist

Education:

M.S. in Aquatic Ecology, 1987 University of Nevada, Las Vegas

B.S. Environmental Science, 1980 Bradley University, Peoria, IL

Qualifications:

In addition to his chemistry and chromatographic experience, Mr. Bartanen has an interdisciplinary background which

includes research in limnology and

experience in microbiology and toxicology.

Neil Jessup

Agronomist - San Joaquin Valley

Education:

B.S. (1977) in Agronomy

California Polytechnic State University

San Luis Obispo

Qualifications:

Mr. Jessup has experience as a pest control advisor and operations manager for several farm management companies. He also has experience as a field representative for a soil, plant tissue and water laboratory.

James "Scott" Bucy

Agronomist - Santa Paula

Education:

B.S. (1977) in Soil Science

California Polytechnical State University

San Luis Obispo

Oualifications:

Mr. Bucy worked as a landscape contractor for nine years. He has also worked as a licensed agricultural pest control advisor and operator. He has been involved in plant, soil, and pest relationships for

over fifteen years.

John Eric Cotting

Environmental Chemist - Santa Paula

Education:

B.S. Chemistry, 1981

University of Alaska, Fairbanks

M.S. Chemistry, 1989

University of Wisconsin, Madison

Qualifications:

Mr. Cotting's undergraduate and graduate research experience is in the areas of physical chemistry involving both macro and small molecules. Previous work experience was in hazardous condition for the University of Alaska Fire Department and general laboratory skills and instrumental methods developed during his education training.

Uday Y. Sathe

Chemist

Education:

M.Sc. (1983) in Chemistry University of Bombay, India M.S. (1988) in Chemistry Mississippi State University

Qualifications:

Research for masters thesis involved separation and identification of compounds like Benzene, Toluene, Chlorbenzene, Allyl Benzene, Chlorotoluene, Napthalene and Biphenyl resulting from vacuum pyrolysis of Allyl Chloride using GC and GC/FTIR.

Also used FTIR and Raman spectrometers for vibrational analysis of some bicycloheptanes.

Also taught general chemistry and senior level physical chemistry labs.

Research involved use of Nicolet 7199
Fourier Transform infared spectrometer with a liquid nitrogen cooled mercury-cadmium telluride (MCT) detector combined with a Nicolet 1280 computer.

Perkin Elmer Model 283 B grating spectrophotometer.

SPEX Ramalog DUV Spectrometer equipped to use the 488-nm line of spectraphysics Model 171 argon ion laser as the exitation source, to obtain the Raman spectra.

Varian 3700 gas chromatograph equipped with flame ionization detector (FID).

Varian-3700 gas chromatograph connected to the gold-coated, glass lightpipe equipped with KBR windows was used for GC/FTIR.

Mr. Sathe has been employed by FGL, Inc. since 1988.

Juan Manuel Magana

Chemist

Education:

B.S. (1987) in Soil Science University of Culiacan, Mexico

Qualification:

Mr. Magana is currently doing organic extractions for the corporation, FGL Environmental. His previous experience is as an assistant in a research project doing soil microbiology for six months.

Jeanine G. Egner:

Environmental Chemist - Santa Paula

Education:

B.S. (1987) in Environmental

Systematic Biology

California Polytechnic State University

San Luis Obispo

Qualifications:

Ms. Egner is an Environmental Chemist responsible for a variety of organic and inorganic analyses in soil, water, and sludge. She also performs environmental assessments, field sampling, and hazardous waste site characterizations. She has over four years experience working in water quality control for government agencies and conducting environmental surveys in the environmental consulting industry.

Santos Marquez

Biologist - Santa Paula

Education:

B.A. in Biological Sciences, 1990 University of California, Santa Barbara

Qualifications:

Mr. Marquez has experience in laboratory work through courses at UC Santa Barbara.

Michel Franco

Environmental Chemist - Santa Paula

Education:

B.A. in Chemistry, 1990 California State University, Northridge

Qualifications:

Ms. Franco worked on the analysis of calcium in serum, using the A.A. at a major medical laboratory. She helped organize the specimen processing lab for greater efficiency. Was used as a liaison between lab sections for sample testing.

Developed fool proof procedure for an Instrumental Analysis Class at CSUN. The analysis of trace zinc in water with a complexing reagent utilizing the A.A.

#### L. Burns

Chemist

Education:

B.S. (1986) in Zoology, University of Idaho, Moscow

Qualifications:

Instrumentation experience including the operation and maintenance of seven different models of Finnigan GC/MS systems, and the Hewlett Packard 5970 MSD.

Group leader experience including the development and implementing of quality control parameters, tracking of analyses through the laboratory to ensure technical compliance with established criteria. Scheduling and training of GC/MS chemists.

GC/MS analytical experience including analysis of soils, liquids, and hazardous wastes for volatiles and semivolatiles for the EPA contract laboratory program and for private industry.

Air toxics GC/MS chemist experience including the analysis of ambient air and source emissions by tedlar bag, summa canistor, carbon molecular sieve, tenax sorbent traps, and charcoal. These methods were achieved with the use of thermal desorption and/or cryogenic preconcentration techniques.

FIGURE II-1

# ORGANIZATION CHART FGL, INC.

<u>President</u> Darrell H. Nelson

Vice President

				John Quinn				
	Santa Paula <u>Laboratory Director</u> Darrell H. Nelson	<u>Technical Dire</u> Dudley Jayas		<b>,</b>	Quality Assurance Steve Castel		Stockto <u>Laboratory (</u> John Qu	Director
		2.2.2.2.	-	Paula Laboratory			•	
Organic Lab Lab Manager Dudley Jayasingh	<u>Inorganic Lab</u> <u>Lab Manager</u> ne Kurt Wilkinson	Agricultural Lab Lab Manager Ricardo Sandoval	Radioactivity Lab Manager Steve Castellano	Bacteriologist Raquel Harvey	Accounting	<u>Office</u>	<u>Field Se</u>	<u>rvices</u>
<u>Chemists</u> Uday Sathe Juan Magana	<u>Chemists</u> Santos Marquez Jeanine Egner		<u>Chemists</u> Michel Franco		<u>Bookkeeper</u> Beverly Baca	Office Manager Kristie Marlow	Agronomist Scott Bucy	<u>Agronomist</u> Neil Jessup
L. Burns			<u>Sam</u> Ma	Santa Paula <u>ple Custodians</u> ria Hernandez rtha Hamblin			<u>Field Supt.</u> George Trouw	
				r Systems Manager ric Cotting				
		<u>Technicians</u> Joan McKinney Daniel Reyna				Customer Services Cindy Aguirre Martha Hamblin Maria Hernandez Tiffany Douglas	<u>Technicians</u> Pete Munoz	
			Stock	ton Laboratory				
				ratory Manager John Quinn			,	
Organic Lab	<u>Inorganic Lab</u>	<u>Bacteriologist</u> Tinni Kar		le Custodian ia De La Cruz		Office	Field Servic	es
<u>Chemist</u> Tom Bartanen	<u>Chemist</u> Tiekang Huang					Office Manager Joanna Culham	<u>Technician</u> Mark Brock	
						<u>Customer Service</u> Linda Quinn Amelia De La Cruz		

#### III. Sample Custody, Tracking, and Sampling Protocol

#### A). Sample Custody

It is essential to ensure sample integrity from collection to data reporting. This includes the ability to trace possession and handling of the sample from the time of collection through analysis and final disposition. This is referred to as chain-of-custody and is important in the event of litigation involving the results. Where litigation is not involved, chain-of-custody procedures are useful for routine control of sample flow.

A sample is considered to be under a person's custody if it is in the individual's physical possession, in the individual's sight, secured in a tamper-proof way by that individual, or is secured in an area restricted to authorized personnel. The following procedures summarize the major aspects of chain-of-custody. More detailed discussions are available.

 Sample Labels: Use labels to prevent sample misidentification. Gummed paper labels or tags generally are adequate. Include at least the following information: Sample number, name of collector, date and time of collection, and place of collection.

Affix labels to sample containers before or at the time of sampling. Fill label out with waterproof ink at time of collection.

2). Sample Seals: Use sample seals to detect unauthorized tampering with samples up to the time of analysis. Use gummed paper seals that include, at least, the following information: Sample number (identical with number on sample label), collector's name, and date and time of sampling. Plastic shrink seals also may be used.

Attach seal in such a way that it is necessary to break it to open the sample container. Affix seal to container before sample leaves custody of sampling personnel.

3). Field Log Book: Record all information pertinent to a field survey or sampling in a bound log book. As a minimum, include the following in the log book; purpose of sampling; location of sampling point; name and address of field contact; producer of material being sampled and address, if different from location: and type of sample. If sample is wastewater, identify process producing waste stream. Also provide suspected sample composition, including concentrations; number and volume of sample taken; description of sampling point and sampling method; date and time of collection; collector's sample identification number(s); sample distribution and transported; references such as maps or photographs of the sampling site; field observations and measurements; signatures of personnel responsible for observations. Because sampling situations vary widely no general rule can be given as to the information to be entered in the log book. It is desirable to record sufficient information so that one could reconstruct the sampling without reliance on the collector's memory. Protect the log book and keep it in safe place.

- 4). Chain-of-Custody Record: Fill out a chain-of-custody record to accompany each sample or group of samples. The record includes the following information: sample number; signature of collector; date, time, and address of collection; sample type; signatures of persons involved in the chain of possession; and inclusive dates of possession.
- 5). <u>Sample Delivery to Laboratory</u>: Deliver sample to laboratory as soon as practicable. Accompany sample with chain-of-custody record and a sample analysis request sheet. Deliver sample to sample custodian.
- 6). Receipt and Logging of Sample: In the laboratory, the sample custodian receives the sample and inspects its condition and seal, reconciles label information and seal against the chain-of-custody record, assigns a laboratory number, logs sample in the laboratory computer, and stores it in a secured storage room or cabinet until it is assigned to an analyst.
- 7). Assignment of Sample for Analysis: The laboratory supervisor usually assigns the sample for analysis. Once in the laboratory, the supervisor or analyst is responsible for the sample's care and custody.
- 8). Safety Considerations: Because sample constituents can be toxic, take adequate precautions during sampling and sample handling. Toxic substances can enter through the skin and, in the case of vapors, through the lungs. Inadvertent ingestion can occur via direct contact with foods or by adsorption of vapors onto foods. Precautions may be limited to wearing gloves or may include coveralls, aprons, or other protective apparel. Always wear eye protection. When toxic vapors might be present, sample only in well-ventilated areas or use a respirator or self-contained breathing apparatus. In a laboratory, open sample containers in a fume hood. Never have food near samples or sampling locations; always wash hands thoroughly before handling food.

If flammable organic compounds may be present, take adequate precautions. Prohibit smoking near samples, sampling locations, and in the laboratory. Keep sparks, flames, and excessive heat sources away from samples, and sampling locations. Avoid buildup of flammable vapors in a refrigerator storing samples because electrical arcing at contacts of thermostat, the door-activated light switch, or other electrical components may trigger a fire or explosion. If flammable compounds are suspected or known to be present and samples are to be refrigerated, use only specially designed explosion-proof refrigerators.

When in doubt as to the level of safety precautions needed, consult an appropriately trained industrial hygienist. Samples with radioactive contaminants require other safety considerations; consult a health physicist.

#### B). Laboratory Sample Control and Tracking

FGL's sample control objectives are achieved through the use of the in-house Laboratory Information Management System (LIMS). LIMS is a computer software system specifically designed by FGL for tracking and handling of the large amount of information required to efficiently manage an analytical chemistry laboratory. The system provides a versatile, easy-to-use vehicle for the laboratory managers to obtain the information needed to make scheduling and priority decisions.

#### C). FGL Sampling Protocol

1). Water Samples: The result of any analytical determination can be no better than the sample on which it is performed. It is not practical to specify detailed procedures for the collection of all samples here because of varied purposes and analytical procedures. More detailed information appears in connection with specific methods. This section presents general considerations, applicable primarily to chemical analyses.

The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and handled in the laboratory while still accurately representing the material being sampled. This objective implies that the relative proportions or concentrations of all pertinent components will be the same in the samples as in the material being sampled, and that the sample will be handled in such a way that no significant changes in composition occur before the tests are made.

A sample may be presented to the laboratory for specific determinations with the collector taking responsibility for its validity. Often, in water and wastewater work, the laboratory conducts or prescribes the sampling program, which is determined in consultation with the user of the test results. Such consultation is essential to insure selecting samples and analytical methods that provide a true basis for answering the questions that prompted the sampling.

General Precautions: Obtain a sample that meets the requirements of the sampling program and handle it in such a way that it does not deteriorate or become contaminated before it reaches the laboratory. Before filling, rinse sample bottle two or three times with the water being collected, unless the bottle contains a preservative or dechlorinating agent. Depending on determinations to be fill full performed. container (most determinations) or leave space for aeration, mixing, etc. (microbiological analyses). For samples that will be shipped, preferably leave an air space of about one (1) percent of container capacity to allow for thermal expansion.

Special precautions are necessary for samples containing organic compounds and trace metals. Because many constituents may be present at concentrations of micrograms per liter, they may be totally or partially lost if proper sampling and preservation procedures are not followed.

Representative samples of some sources can be obtained only by making composites of samples collected over a period of time or at many different sampling points. The details of collection vary so much with local conditions that no specific recommendations would be universally applicable.

Sometimes it is more informative to analyze numerous separate samples instead of one composite so as not to obscure maxima and minima.

Sample carefully to insure that analytical results represent the actual sample composition. Important factors affecting results are the presence of suspended matter or turbidity, the method chosen for its removal, and the physical and chemical changes brought about by storage or aeration. Particular care is required when processing (grinding, blending, sieving, filtering) samples to be analyzed for trace constituents, especially metals and organic compounds. Some determinations, particularly of lead, can be invalidated by contamination from such processing. Treat each sample individually with regard to the substances to be determined, the amount and nature of turbidity present, and other conditions that may influence the results.

It is impractical to give directions covering all conditions, and the choice of technique for collecting a homogeneous sample must be left to the analyst's judgment. In general, separate any significant amount of suspended matter by decantation, centrifugation, or an appropriate filtration procedure. Often a slight turbidity can be tolerated if experience shows that it will cause no interference in gravimetric or volumetric tests and that its influence can be corrected in colorimetric tests, where it has potentially the greatest interfering effect. When relevant, state whether or not the sample has been filtered. To measure the total amount of a constituent, do not remove suspended solids, but treat them appropriately.

Make a record of every sample collected and identify every bottle, preferably by attaching an appropriately inscribed tag or label. Record sufficient information to provide positive sample identification at a later date, including the name of the sample collector, the date, hour, and exact location, the water temperature, and any other data that may be needed for correlation, such as weather conditions, water level, stream flow, post-sampling handling, etc. Provide space on the label for the initials of those assuming sample custody and for the time and date of transfer. Fix sampling points by detailed description, by maps, or with the aid of stakes, buoys, or landmarks in a manner that will permit their identification by other persons without reliance on memory or personal guidance. Particularly when sample results are expected to be involved in litigation, use formal "chain-of-custody" procedures which trace sample history from collection to final reporting.

Cool hot samples collected under pressure while they are still under pressure.

Before collecting samples from distribution systems, flush lines sufficiently to insure that the sample is representative of the supply, taking into account the diameter and length of the pipe to be flushed and the velocity of flow.

Collect samples from wells only after the well has been pumped sufficiently to insure that the sample represents the groundwater source. Sometimes it will be necessary to pump at a specified rate to achieve a characteristic drawdown, if this determines the zones from which the well is supplied. Record pumping rate and drawdown.

When samples are collected from a river or stream, observed results may vary with depth, stream flow, and distance from shore and from one shore to the other. If equipment is available, take an "integrated" sample from top to bottom in the middle of the stream or from side to side at mid-depth.

Lakes and reservoirs are subject to considerable variations from normal causes such as seasonal stratification, rainfall, runoff, and wind. Choose location, depth, and frequency of sampling depending on local conditions and the purpose of the investigation. Avoid surface scum.

For certain constituents, sampling location is extremely important. Avoid areas of excessive turbulence because of potential loss of volatile constituents and of potential presence of toxic vapors. Avoid sampling at weirs because such locations tend to favor retrieval of lighter-than-water, immiscible compounds. Generally, collect samples beneath the surface in quiescent areas. If composite samples are required, take care that sample constituents are not lost during compositing because of improper handling of portions being pooled. For example, casual dumping together of portions rather than addition to the composite through a submerged siphon can cause unnecessary volatilization.

Use only representative samples (or those conforming to a sampling program) for examination. The great variety of conditions under which collections must be made makes it impossible to prescribe a fixed procedure. In general, take into account the tests or analyses to be made and the purpose for which the results are needed.

#### b). Types of Samples

1). Grab or Catch Samples: Strictly speaking, a sample collected at a particular time and place can represent only the composition of the source at that time and place. However, when a source is known to be fairly constant in composition over a considerable period of time or over substantial distances in all directions, then the sample may be said to represent a longer time period or a larger volume, or both, than the specific point at which it was collected. In such circumstances, some sources may be represented quite well by single grab samples.

Examples are some water supplies, some surface waters, and rarely, some wastewater streams. When a source is known to vary with time, grab samples collected at suitable intervals and analyzed separately can document the extent, frequency, and duration of these variations. Choose sampling intervals on the basis of the frequency with which changes may be expected, which may vary from as little as five (5) minutes to as long as one (1) hour or more. Seasonal variations in natural systems may necessitate sampling over months. When the source composition varies in space rather than time, collect samples from appropriate locations.

Use great care in sampling wastewater sludges, sludge banks, and muds. No definite procedure can be given, but take every possible precaution to obtain a representative sample or one conforming to a sampling program.

2). <u>Composite Samples</u>: In most cases, the term "composite sample" refers to a mixture of grab samples collected at the same sampling point at different times. Sometimes the term "time-composite" is used to distinguish this type of sample from others. Time-composite samples are most useful for observing average concentrations that will be used, for example, in calculating the loading or the efficiency of a wastewater treatment plant. alternative to the separate analysis of a large number of samples, followed by computation of average and total results, composite samples represent a substantial saving in laboratory effort and expense. For these purposes, a composite sample representing a 24 hour period is considered standard for most determinations. circumstances, however, certain a composite representing one shift, or a shorter time period, or a complete cycle of a periodic operation, may be preferable. To evaluate the effects of special, variable, or irregular discharges and operations, collect composite samples representing the period during which such discharges occur.

For determining components or characteristics subject to significant and unavoidable changes on storage, do not use composite samples. Make such determinations on individual samples as soon as possible after collection and preferably at the sampling point. Analyses for all dissolved gases, residual chlorine, soluble sulfide, temperature, and pH are examples of this type of determination. Changes in such components as dissolved oxygen or carbon dioxide, pH, or temperature may produce secondary changes in certain inorganic constituents such as iron, manganese, alkalinity, or hardness. Use time-composite samples only for determining components that can be demonstrated to remain unchanged under the conditions of sample collection and preservation.

Take individual portions in a wide-mouth bottle having a diameter of at least 35 mm at the mouth and a capacity of at least 120 mL. Collect these portions every hour - in some cases every half hour or even every five (5) minutes - and mix at the end of the sampling period or combine in a single bottle as collected. If preservatives are used, add them to the sample bottle initially so that all portions of the composite are preserved as soon as collected. Analysis of individual samples sometimes may be necessary. It is desirable, and often essential, to combine individual samples in volumes proportional to flow. A final sample volume of 2 to 3 L is sufficient for sewage, effluents, and wastes.

Automatic sampling devices are available; however, do not use them unless the sample is preserved as described below. Clean sampling devices, including bottles, daily to eliminate biological growths and other deposits.

Integrated Samples: For certain purposes, the information needed is provided best by analyzing mixtures of grab samples collected from different points simultaneously, or as nearly so as possible. Such mixtures sometimes are called integrated samples. An example of the need for such sampling occurs in a river or stream that varies in composition across its width and depth. To evaluate average composition or total loading, use a mixture of samples representing various points in the cross-section, in proportion to their relative flows. The need for integrated samples also may exist if combined treatment is proposed for several separate wastewater streams, the interation of which may have a significant effect on treatability or even on composition. Mathematical prediction of the interactions may be inaccurate or impossible and testing a suitable integrated sample may provide more useful information.

Both natural and artificial lakes show variations of composition with both depth and horizontal location. However, under many conditions, neither total nor average results are especially significant; local variations are more important. In such cases, examine samples separately rather than integrate them.

Preparation of integrated samples usually requires special equipment to collect a sample from a known depth without contaminating it with overlying water. Knowledge of the volume, movement, and composition of the various parts of the water being sampled usually is required. Therefore, collecting integrated samples is a complicated and specialized process that cannot be described in detail.

#### 2). Hazardous Waste Samples

a). Volatile Organics: Standard 40 mL glass screw-cap VOA vials with Teflon-faced silicone septum may be used for both liquid and solid matrices. The vials and septum should be soap and water washed and rinsed with distilled deionized water. After thoroughly cleaning the vials and septum, they should be placed in a muffle furnace and dried at 150 C for approximately one hour. (Note: Do not heat the septum for extended periods of time, i.e., more than one hour, because the silicone begins to slowly degrade at 105 C).

When collecting the samples, liquids and solids should be introduced into the vials gently to reduce agitation which might drive off volatile compounds. Liquid samples should be poured into the vial without introducing any air bubbles within the vial as it is being filled. Should bubbling occur as a result of violent pouring, the sample must be poured out and the vial refilled. Each VOA vial should be filled until there is a meniscus over the lip of the vial. The screw-top lid with the septum (Teflon side toward the sample) should then be tightened onto the vial. After tightening the lid, the vial should be inverted and tapped to check for air bubbles. If there are any air bubbles present the sample must be retaken. Two VOA vials should be filled per sample location.

VOA vials for samples with solid or semi-solid (sludges) matrices should be completely filled as best as possible. The vials should be tapped slightly as they are filled to try and eliminate as much free air space as possible. Two vials should also be filled per sample location.

VOA vials should be filled and labeled immediately at the point at which the sample is collected. They should NOT be filled near a running motor or any type of exhaust system because discharged fumes and vapors may contaminate the samples. The two vials from each sampling location should then be sealed in separate plastic bags to prevent cross-contamination between samples particularly if the sampled waste is suspected of containing high levels of volatile organics. (Activated carbon may also be included in the bags to prevent cross-contamination from highly contaminated samples). VOA samples may also be contaminated by diffusion of volatile organics through the septum during shipment and storage. To monitor possible contamination, a trip blank prepared from distilled deionized water should be carried throughout the sampling, storage, and shipping process.

- Semivolatile Organics: (This includes Pesticides and Herbicides) Containers used to collect samples for the determination of semivolatile organic compounds should be soap and water washed followed by methanol (or isopropanol) rinsing. The sample containers should be of glass or Teflon and have screw-top covers with Teflon liners. In situations where Teflon is not available, samples may react with the aluminum foil, causing eventual contamination of the sample. Plastic containers or lids may <u>NOT</u> be used for the storage of samples due to the possibility of sample contamination from the phthalate esters and other hydrocarbons within the plastic. Sample containers should be filled with care so as to prevent any portion of the collected sample coming in contact with the sampler's gloves, thus causing contamination. Samples should not be collected or stored in the presence of exhaust fumes. If the sample comes in contact with the sampler (e.g., if an automatic sampler is used), run reagent water through the sampler and use as a field blank.
- c). <u>Trace Metals</u>: In the determination of trace metals, containers can introduce either positive or negative errors in the measurement of trace metals by (a) contributing contaminants through leaching or surface desorption, and (b) depleting concentrations through adsorption. Thus the collection and treatment of the sample prior to analysis require particular attention.

#### 3). Underground Storage Tank Samples

a). Field Notebook: The field investigator should keep a field notebook (preferably bound with pages numbered) to record sample collection procedures, dates, laboratory identification, sample collection location, and the name of the sampler. This is important for later recall or legal challenge.

#### b). Soil Samples

1). Hydrocarbons: Soil samples collected from a backhoe, the ground or a soil coring device, should be collected in a thin-walled stainless steel or brass cylinder at least three inches long by one inch in diameter that has been prepared by the laboratory doing the analysis or the project consultant (cylinders can be made to fit inside the preferred split-barrel core sampler). About one inch of soil should be removed from the immediate surface area where the sample is to be taken and the cylinder then pounded into the soil with a wooden mallet. No headspace should be present in the cylinder once the sample is collected. When the sample is collected, each end of the cylinder should be covered with aluminum foil and then capped with a polyethylene lid, taped, and labeled. should then be immediately placed in an ice chest containing dry ice and kept frozen for delivery to the laboratory. Care should be taken throughout to avoid contamination of both the inside and outside of the cylinder and its contents.

Samples should be kept frozen at the laboratory until they are analyzed. Holding time should not exceed 14 days from the time of collection. Frozen soil cores should be removed from the cylinders by spot heating the cylinder and immediately extruding the sample (or a portion of it). A portion of the frozen sample should be removed and prepared for analysis according to approved EPA methods.

In situations where the above procedure is inappropriate, i.e. semi-solid samples, glass vials (properly prepared by contract laboratory consultant) with Teflon seal and screw cap should be used, and maintained at 4 C until analysis.

- 2). Organic Lead: Tetraethyl/tetramethyl-lead are volatile; therefore, soil samples should be collected in cylinders and frozen as described for volatile hydrocarbons above.
- 3). <u>Shipping Samples</u>: Where commercial shippers are involved, dry ice may present Department of Transportation (DOT) shipping problems and "blue ice" may have to be substituted.

#### 4). Water Samples

Free Floating Product (from a well): Sampling of free floating product on the surface of ground water should not be performed until the well has been allowed to stabilize for at least 24 hours after development or other withdrawal procedure. A sample should be collected that is indicative of the thickness of floating product within the monitoring well. This may be accomplished by the use of a clear, acrylic bailer designed to collect a liquid sample where free product and ground water meet. A graduated scale on the bailer is helpful for determining the thickness of free product. Samples should be field-inspected for the presence of odor and/or sheen in addition to the above evaluation.

Electronic measuring devices also are available for determining the thickness of the hydrocarbon layer floating on ground water.

5). Dissolved Product (from a well): If free product is detected, analysis of water for dissolved product should be conducted after the free product has been substantially removed from the well. Before collecting a water sample, a well should be purged until temperature, conductivity and pH stabilize. Often, this will require removal of four or more well volumes by bailing or pumping. Once well volumes are removed and well water is stabilized, a sample can be taken after the water level approaches 80 percent of its initial level. Where water level recovery is slow, the sample can be collected after stabilization is achieved.

Ground water samples should be collected in a manner which reduces or eliminates the possibility of loss of volatile constituents from the sample. For collecting samples, a gas-actuated positive displacement pump or a submersible pump is preferred. A Teflon or stainless steel bailer is acceptable. Peristaltic pumps or airlift pumps should not be used.

Cross-contamination from transferring pumps (or bailers) from well to well can occur and should be avoided by thorough cleaning between sampling episodes. Dedicated (i.e., permanent installation) well pumps, while expensive, are often cost effective in the long term and ensure data reliability relative to cross-contamination. If transfer of equipment is necessary, sampling should proceed from the least contaminated to the most contaminated well, if the latter information is available before sample collection.

Water samples should be collected in vials or containers specifically designed to prevent loss of volatile constituents from the sample. These vials should be provided by an analytical laboratory, and preferably, the laboratory conducting the analysis. No headspace should be present in the sample container once the container has been capped. This can be checked by inverting the bottle, once the sample is collected, and looking for bubbles. Sometimes it is not possible to collect a sample without air bubbles, particularly if water is aerated. In these cases, the investigator should record the problem and account for probable error. Cooling samples may also produce headspace (bubbles), but these will disappear once the sample is warmed for analysis.

Samples should be placed in an ice chest maintained at 4 C with blue ice (care should be taken to prevent freezing of the water and bursting of the glass vial). A thermometer with a protected bulb should be carried in each ice chest.

6). Surface Water: Grab samples should be collected in appropriate glass containers supplied by the laboratory. The sample should be collected in such a manner that air bubbles are not entrapped. Semisolid samples should be collected the same way. The collected samples should be refrigerated (blue ice, 4 C) for transport and analyzed within seven (7) days of collection (14 days with preservatives).

#### 4). Pesticide Residue Sampling Procedures

- a). Samples Regarding Re-entry/Worker Safety: All samples should be from the plant foliage (leaf tissue) when pesticides are applied to the foliage. Sometimes areas other than the plant foliage may be in question, such as the dripline area surface soil and/or the leaf duff (leaf litter) under the trees. The sample should be large enough to fill a normal "lunch bag" and be taken from several plantings.
- b). <u>Samples Regarding Consumer Safety</u>: The edible portion of the plant or fruit should be collected. The sample should contain approximately one (1) pound of material taken from several plants. Usually six to eight whole plants or fruit pieces will make up a good sample.

#### D). Sample Handling Policy

- 1). Sample Handling Instructions
  - a). Sample Container & Volume The use of proper sample containers holding an appropriate volume of sample is essential to FGL Environmental's quality assurance program. The Recommended Sample Collection and Preservation shows the type of containers and the volume required for each analysis.
  - b). <u>Sample Preservation</u> The proper preservation of samples is a fundamental element of FGL Environmental's quality assurance program. The Recommended Sample Collection and Preservation shows the preservation measures required for each analysis. FGL Environmental's staff follows methods listed in the <u>Handbook for Sampling and Sample</u> <u>Preservation of Water and Wastewater</u>. U.S. EPA Monitoring and Support Laboratory; Cincinnati, Ohio; September 1982.
  - c). Sample Holding Times Strict observance of the holding time requirement for each type of analyses is essential to FGL Environmental's quality assurance program. The Recommended Sample Collection and Preservation shows the maximum allowable holding times for each analysis.

The information given in The Recommended Sample Collection and Preservation is based on recommendations in EPA Methods for Chemical Analysis of Water and Wastewater (EPA-600/4-79-020) and EPA Test Methods for Evaluating Solid Waste (SW-846).

#### 2). Sample Receiving Policy

a).	Obtain the	following	client	information	and	place	on	customer
	lab ticket:							

Billing Name:		
Address:		
Phone Number:		
Person to Contact:		
Report Form Required: State	FGL	
Is Chain of Custody required Yes		No
<del></del>		

- b). Determine the analyses needed and indicate on customer lab ticket:
  - 1). Use EPA Method Number or list elements
  - 2). Determine if preservatives have been added

c).	Determine turn-around-time requirement:Rush Non-Rush
	Indicate on the customer lab ticket and the laboratory work sheet if a rush is required. The red colored rush stamp is to be used for this purpose.  -21-

- d). Inspect the sample for the following:
  - Have holding times been observed and determine if it is possible for FGL to meet holding times? (See attached holding time requirements)
  - 2). Is the sample size adequate?
  - 3). Is the sample container satisfactory? (See attached sample container requirements)
  - 4). Note sample condition

Broken/leaking co	ntainer	
Custody Seal	Intact	Broken
Temperature	Ambient	Chilled
Record Actual Tem	perature	
Check for headspa	ce when approp	riate

Make note of any problems with sample condition on the customers lab ticket, the person notified, time and date notified, and customers response, if any.

Check all samples for radioactivity analyses and hazardous waste evaluation for radio chemical hazard using the Model 3 Survey Meter kept in the log-in room. If the sample is found to have a reading of 0.3 mrads/hour or greater; then, the sample must be refused.

- e). Log the sample information into the laboratory computer under one of the following categories: Inorganic Drinking and Wastewater Lab Samples, Organic Lab Samples, Radioactivity Lab Samples, and Ag Lab Samples.
- f). Transfer samples and analyses instructions (lab work sheets) to the appropriate refrigerator or lab work distribution area. See the attached sheet titled "Sample Storage and Distribution Policy".



# FRUIT GROWERS LABORATORY, INC.

**CHAIN-OF-CUSTODY** 

FIGURE III-1

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Comp sampler setup:Date:// Time::	Composite(C)			(c) e	(SW) Surface Water (MW) Monit (GW) Ground Water (TB) Trave (WW) Wastewater (S) Spike (DW) Drinking Water	(NP) None Potable	, HC									Sample Condition: Temperature (L) Leaking, (B) Broken (HS) VOA Headspace	<u>E</u>
Time: Mileage:			ers:	ludg	er ater	N GN	4504 7 4 4									n: B)B	1 1
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QA/QC report required: Yes No	Type of Sample:	ا ا	Type of Containers:		face und tewir	(P) Potable	Preservative:NaHSO4, H NaOH pH> 9 or pH> 12 Other									Cond King	Seal
Lab number:	_  *		٥	Soil	Sur Gro Has	Pot	OH p									Lea VO	ò
Sample Location/Description Date Time Sampled Sampled	N N		Type	(S)	E E E E	E.	Pres Na Ot							1	ł	(F) (H)	Custody
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Rush results due hy:																	
Rush results due by: Final sample disposition:																	
Lab disposal: Return to Client:	-														-		
Meth. of disp.: Date of ret.://										-71							

TABLE III-1 Recommended Sample Collection and Preservation

Analysis	Container	Volume (mL)	Preservation	Holding Time						
General Inorganic Chemistry										
Acidity Alkalinity Ammonia Bicarbonate Biochemical Oxygen	P,G P,G P,G P	250 250 250 250 250 1000	Cool, 4 C Cool, 4 C H2SO4, pH <2; Cool, 4 C Cool, 4 C Cool, 4 C	14 days 14 days 28 days 14 days 48 hours						
Demand Boron Carbonate Carbon Dioxide Chemical Oxygen Demand	P P,G P,G	100 250 250 100	Cool, 4 C Cool, 4 C Cool, 4 C H2SO4, pH <2; Cool, 4 C	28 days 14 days Analyze immed. 28 days						
Chloride Chlorine Residual Chlorine Demand Color Cyanide, Total Electrical	P,G P,G P,G P,G P	100 500 2000 100 1000	Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C NaOH, pH >12; Cool, 4 C Cool, 4 C	7 days 2 hours 2 hours 48 hours 14 days 28 days						
Conductivity Fluoride Hardness, Total Hydroxide Langelier Index MBAS	P,G P,G P P,G P,G	100 100 250 500 500	Cool, 4 C HNO3, pH <2; Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C	7 days 6 months 14 days 2 hours 24 hours						
Nitrogen, Ammonia Nitrate	P,G P,G	100 100	H2SO4, pH <2; Cool, 4 C H2SO4, pH <2; Cool, 4 C w/o preservation	28 days 28 days 48 hours						
Nitrite Organic Total Total Kjeldahl Odor Oil and Grease Oxygen, Dissolved	P,G P,G P,G G G, w/glass	100 400 100 200 500 1000 300	Cool, 4 C H2SO4, pH <2; Cool, 4 C H2SO4, pH <2; Cool, 4 C H2SO4, pH <2; Cool, 4 C Cool, 4 C H2SO4, pH <2; Cool, 4 C Cool, 4 C	48 hours 28 days 28 days 28 days 48 hours 28 days Analyze immed.						
pH Phenolics Phosphorus	P,G G, amber	50 500	Cool, 4 C H2SO4, pH <2; Cool, 4 C	2 hours 28 days						
Ortho or Dissolved Total Resistivity Silica Sodium Percent Sodium Absorption Ratio	P,G P,G P P P	100 50 100 50 200	Cool, 4 C H2SO4, pH <2; Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C	48 hours 28 days 28 days 28 days 6 months 6 months						

P = plastic, G = glass
All solid samples should be kept cool at 4 C
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TABLE III-1 (cont'd.)

Recommended Sample Co	ll <b>ection a</b> nd	Preservatio	n	Holding
Analysis	Container	(mL)	Preservation	Time
General Inorganic Che	mistry conti	nued		
Solids, Filterable Non-filterable Total Volatile Settleable Sulfate Sulfide Total	P,G P,G P,G P,G P,G	100 100 100 100 1000 200	Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C	7 days 7 days 7 days 7 days 48 hours 28 days 7 days
Dissolved Tannin & Lignin Titration - pH adjustment Turbidity	P,G G P,G P,G	500 250 250 100	plus NaOH to pH >9 Cool, 4 C Cool, 4 C	24 hours 14 days 48 hours
Trace Metals Chromium VI Mercury All other metals	P,G P,G P	500 200 200	Cool, 4 C HNO3, pH <2 HNO3, pH <2	24 hours 28 days 6 months
Radio Chemical			•	
Gross Alpha & Beta* Total Radium Total Uranium Radon Tritium Strontium 90	P P P G 2 G	1000 1000 1000 × 250 250 1000	HNO3, pH <2 HNO3, pH <2 HC1, pH <2 Cool, 4 C Cool, 4 C HC1, pH <2	6 months 28 days 6 months 36 hours N/A 6 months

^{*} For non-preserved samples, the holding time is 5 days.
For preserved samples, please provide either a non-preserved sample (100 mL) or the E.C. (obtained prior to acidification).

#### Bacteriological

Coliform-Fecal & P,G 100 0.008% Na2S203; 30 hours Total Cool, 4 C

Note: All solid samples should be collected in stainless steel sleeves, brass sleeves or in amber glass jars all with teflon-lined caps and 100-250g capacity. All solid samples should be kept cool at 4 C.

P = plastic, G = glass

TABLE III-1 (cont'd.) Recommended Sample Collection and Preservation

Analysis	Container	Volume (mL)	Preservation	Holding Time
Organic Chemicals*				
Drinking Water				
Title 22 Organics (EPA 505 & 515)	Amber glass TFE-lined cap	2 x 125 1 x 1000	Na2S2O3, if chlorinated Cool, 4 C	7 days**
EPA 501	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated HCl or NaHSO4 pH <2 Cool, 4 C	14 days
EPA <b>502.</b> 2	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated HCl pH <2; Cool, 4 C	14 days
EPA <b>504</b>	Glass TFE-septa cap	2 x 125	Cool, 4 C	28 days
EPA <b>505</b>	Glass TFE-septa cap	2 x 125	Na2S2O3, if chlorinated Cool, 4 C	7 days**
EPA <b>507</b>	Amber glass TFE-lined cap	1 x 1000	Na2S2O3, if chlorinated or HCl pH <2; Cool, 4 C	14 days
EPA 508	Amber glass TFE-lined cap	1 x 1000	Cool, 4 C	7 days**
EPA 515	Amber glass TFE-lined cap	1 x 1000	Cool, 4 C	7 days**
EPA 515.1	Amber glass TFE-lined cap	1 x 1000	Cool, 4 C	7 days**
EPA 524.2	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated or HCl pH <2; Cool, 4 C	14 days
EPA 525	Amber glass TFE-lined cap	2 x 1000	Cool, 4 C	7 days**
EPA 531	Amber glass	250	Na2S2O3, if chlorinated Monochloroacetic acid, (suggested) pH=3	14 days
EPA <b>54</b> 7	Amber glass	125	Na2S2O3, if chlorinated Cool, 4 C	14 days

No head space over sample.
 ** This is the maximum holding time prior to extraction. The extracted sample may be held up to 40 days before analysis.
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TABLE III-1 (cont'd.)

Recommended Sample Collection and Preservation

Analysis	Container	Volume (mL)	Preservation	Holding Time							
Organic Chemicals	•	( - 7									
Wastewater and Hazardous Waste											
EPA 601/8010	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated HCl or NaHSO4, pH <2 Cool, 4 C	14 days							
EPA 602/8020	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated HCl or NaHSO4, pH <2 Cool, 4 C	14 days							
EPA 603/8030	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated Adjust pH to 4-5 Cool, 4 C	14 days							
EPA 604/8040	Amber glass TFE-lined cap	1 x 1000	Na2S2O3, if chlorinated Cool, 4 C	7 days**							
EPA 608/8080	Amber glass TFE-lined cap	1 x 1000	Na2S2O3, if chlorinated Cool, 4 C	7 days**							
EPA 614/8140	Amber glass TFE-lined cap	1 x 1000	Cool, 4 C	7 days**							
EPA 615/8150	Amber glass TFE-lined cap	1 x 1000	Na2S2O3, if chlorinated Cool, 4 C	7 days**							
EPA 619	Amber glass TFE-lined cap	1 x 1000	Cool, 4 C	14 days							
EPA 624/8240	Glass (VOA) TFE-septa cap	2 x 40	Na2S2O3, if chlorinated HCl, pH <2; Cool, 4 C	14 days							
EPA 625/8270	Amber glass TFE-lined cap	1 x 1000	Na2S2O3, if chlorinated Cool, 4 C	7 days**							
EPA 9020 (TOX)	Amber glass TFE-lined cap	250	H2SO4, pH <2 Cool, 4 C	14 days* 7 days***							

Note: All solid samples should be collected in stainless steel sleeves, brass sleeves or in amber glass jars all with teflon-lined caps and 100-250g capacity. All solid samples should be kept cool at 4 C.

No head space over sample.

^{**} This is the maximum holding time prior to extraction. The extracted sample may be held up to 40 days before analysis.

^{***} RCRA holding time is 7 days.

TABLE III-1 (cont'd.)

#### Recommended Sample Collection and Preservation

Analysis	Container	Volume (mL)	Preservation	Holding Time
Organic Chemicals*	•			
Wastewaters and Ha	zardous Waste			
EPA 415.1 (TOC)	Amber glass TFE-lined cap	250	HCl or H2SO4, pH <2 Cool, 4 C	28 days
EPA 9060	See solids note	250 g	Cool, 4 C	N/A
DBCP and/or EDB	Amber glass TFE-lined cap	2 x 125	Na2S2O3, if chlorinated HCl pH <2, Cool, 4 C	7 days**
TCE and/or PCE	Amber glass TFE-lined cap	2 x 125	Na2S2O3, if chlorinated HCl pH <2, Cool, 4 C	7 days**
Underground Storag	e Tank Analyses*			
EPA 8015, 8015M, 418.1	Glass (VOA) TFE-septa cap	2 x 40	HCl, pH <2 Cool, 4 C	14 days
EPA 602/8020	Glass (VOA) TFE-septa cap	2 x 40	HCl or NaHSO4, pH <2 Cool, 4 C	14 days
EPA 8010	Glass (VOA) TFE-septa cap	2 x 40	HCl or NaHSO4, pH <2 Cool, 4 C	14 days
EPA 7421/7420 (Total Lead)	Plastic/Glass	200	HNO3, pH <2 Cool, 4 C	6 months
EPA 7420 (Soluble Lead)	Plastic/Glass	200	Cool, 4 C	14 days

Note: All solid samples should be collected in stainless steel sleeves, brass sleeves or in amber glass jars all with teflon-lined caps and 100-250g capacity. All solid samples should be kept cool at 4 C.

^{*} No head space over sample.

^{**} This is the maximum holding time prior to extraction. The extracted sample may be held up to 40 days before analysis.

TABLE III-1 (cont'd.)

Recommended Sample Collection and Preservation

<b>Analys</b> is	Container	Volume (mL)	Preservation	Holding Time				
Hazardous Waste Charac	Hazardous Waste Characterization							
Corrosivity	Glass/plastic	100	Cool, 4 C	7 days				
Ignitability	Glass TFE-lined cap	100	Cool, 4 C	7 days				
Reactivity								
Reactions	Glass TFE-lined cap	100	Cool, 4 C	7 days				
Sulfide/Cyanide generation	Glass TFE-lined cap	100	Cool, 4 C	7 days				
TCLP and EP Toxicity								
Metals	Glass TFE-lined cap	500	Cool, 4 C	30 days				
Pesticides	Amber glass TFE-lined cap	1000	Cool, 4 C	7 days**				
Herbicides	Amber glass TFE-lined cap	1000	Cool, 4 C	7 days**				
Bioassays								
Toxicity Bioassay	Glass/plastic	30 L	Cool, 4 C	24 hours				
Calif. Acute Toxicity	Glass/plastic	25 L	Cool, 4 C	24 hours				
Definitive	Glass/plastic	60 L	Cool, 4 C	24 hours				

Note: All solid samples should be collected in stainless steel sleeves, brass sleeves or in amber glass jars all with teflon-lined caps and 100-250g capacity. All solid samples should be kept cool at 4 C.

^{**} This is the maximum holding time prior to extraction. The extracted sample may be held up to 14 days before analysis.

#### IV. Analytical Procedures

#### A). Method Sources

The analytical methods used by FGL are primarily those published by the U.S. Environmental Protection Agency. Some methods are from Standard Methods for the Examination of Water and Waste Water, 17th Edition, APHA-AWWA-WPCF, 1989. Other methods are used, when applicable, according to project specific requirements.

FGL uses methods found in the following EPA Manuals:

Procedures Manual for Ground water Monitoring at Solid waste disposal Facilities, EPA SW-600.

EPA Test methods for Evaluating Solid Waste, EPA SW-846.

EPA Methods of Chemical Analysis in Waters and Wastewaters (MCAWW) EPA-600/4-79-020)

Prescribed Procedures for Measurement of Radioactivity in Drinking Water (EPA-600/4-80-032)

#### B). Specific Methods Used

The analytical methods performed at FGL fall into four general categories: Drinking water methods, waste water and groundwater methods, hazardous waste methods, and sludge methods. These methods are listed in Tables IV-1 through IV-4.

Table IV-1

### **DRINKING WATER METHODS**

Parameter	Method	Description
Organic Chemicals		
Chlorinated Pesticides & Herbicides Alachlor, Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Lindane, Methoxychlor, PCB's, Toxaphene, Bentazon, 2,4-D, 2,4,5-TP (Silvex)	EPA 505 & 515.1 (Title 22)	GC/ECD, micro extraction/ liquid-liquid extraction
Trihalomethanes Volatile Organics Trichloroethylene (TCE) Tetrachloroethylene (PCE) TCE & PCE Dibromochloropropane (DBCP) Ethylene dibromide (EDB) EDB & DBCP Chlorinated Pesticides Alachlor, Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Lindane, Methoxychlor,	EPA 501 EPA 502.2 EPA 502.2/524.2} EPA 502.2/524.2} EPA 502.2/524.2} EPA 504 EPA 504 EPA 504 EPA 504 EPA 504	GC/ECD, micro extraction GC/PID/Hall, purge & trap GC/PID/Hall, purge & trap or GC/MS, purge & trap GC/ECD, micro extraction
PCB's, Toxaphene Nitrogen/phosphorus Pesticides Atrazine, Bromacil, Diazinon, Dimethoate Molinate, Prometryn, Simazine, Thiobencarb	EPA 507	GC/NPD, liquid-liquid extraction
Chlorothalonil	EPA 508	GC/ECD, liquid-liquid extraction
Herbicides Bentazon, 2,4-D, 2,4,5-TP (Silvex)	EPA 515.1	п
Volatile Organics Diethylhexylphthalate	EPA 524.2 EPA 525	GC/MS, purge & trap GC/MS, liquid-liquid
Carbamates Aldicarb Sulfone, Aldicarb Sulfoxide, Oxamyl, Methomyl, 3-Hydroxycarbofuran, Aldicarb, Propoxur, Carbofuran,	EPA 531	extraction HPLC, post column derivatization
Carbaryl, 1-Naphthol, Methiocarb Glyphosate (Roundup)	EPA 547	HPLC, post column derivatization
Bacteriological Analyses		
Total Coliform - 5 tube procedure Total Coliform - 10 tube procedure Total & Fecal Coliform - 5 tube procedure Total & Fecal Coliform - 10 tube procedure	SM 908A SM 908A SM 908C SM 908C	Fermentation, MPN " " "
Standard Plate Count Total Coliform-Colilert (24 hour turn-around)	SM 908A MMO-MUG	Incubation, visual count Fermentation, MPN

Table IV-1

### DRINKING WATER METHODS (cont'd.)

Parameter		Method	Description
General Inorganic Chemistry			
Acidity Alkalinity	(CaCO3)	EPA 305.1 EPA 310.1	Titration Titration
Ammonia By colorimetric By distillation (low le Bicarbonate Biochemical Oxygen Demand Bromide Carbonate Carbon Dioxide Chemical Oxygen Demand Chloride Chlorine Residual Chlorine Demand Color Cyanide, Total Electrical Conductivity Fluoride By electrode By distillation Hardness, total	(HCO3) (BOD5) (Br) (CO3) (CO2) (COD) (C1) (C12) (CN) (EC) (F)	EPA 350.1 EPA 350.2 EPA 310.1 EPA 405.1 SM 405 EPA 310.1 SM 406 EPA 410.2 EPA 325.3 SM 407C SM 409A EPA 110.3 EPA 335.2 EPA 120.1 EPA 340.2 EPA 130.2	Colorimetric Dist./Colorimetric Colorimetric ISE Colorimetric Titration Titration Colorimetric Titration Titration Visual Colorimetric Conductivity Bridge  ISE Distillation/ISE Titration
Hydroxide Langelier Index (corrosiv (langelier index calc. MBAS	(OH) ity) only)	EPA 310.1 SM 203 Calc. EPA 425.1	Titration Colorimetric
Nitrogen Ammonia Nitrate Nitrite Organic Total	(NH3) (NO3) (NO2) (TKN - NH3) (TKN + NO3 + NO2)	EPA 350.1 EPA 353.2 EPA 353.2 Calc.	Colorimetric Colorimetric Colorimetric
Total Kjeldahl Nitroger Odor Oil and Grease Oxygen, Dissolved Phenols		EPA 351.2 EPA 140.1 EPA 413.1 EPA 360.1 EPA 420.1	Colorimetric Gravimetric ISE Colorimetric
Phosphorus Ortho Dissolved-ortho Total Total-dissolved pH	(P04-P) (P04-P) (P) (P)	EPA 365.2 EPA 365.2 EPA 365.4 EPA 365.4 EPA 150.1	Colorimetric Colorimetric Colorimetric Colorimetric ISE
Resistivity Sodium Percent Sodium Absorption Ratio (SAR calculation only)	(SAR)	Calc. EPA 200.7 Calc.	ICP

Table IV-1

# DRINKING WATER METHODS (cont'd.)

Parameter			Method	Descrip	tion	
General Inorganic Chemistry continued						
0.711.49.41						
Solids/Residue		nc)	EPA 1 <b>60.</b> 1	Gravimet	ric	
Filterable Non-filtera		DS) Suspended)	EPA 160.1			
Total	101e (3	uspended)	EPA 160.3			
Volatile			EPA 160.4			
Settleable			EPA 160.5			
Sulfate	(5	(04)	EPA 375.4			
Sulfide		125)				
Total	•	,	EPA 376.1	Methylen	e Blue	
Dissolved			EPA <b>376.</b> 1			
Tannin & Ligni	in		SM 513	Colorime	tric	
Titration - pl			Calc.			
Turbidity	•		EPA 180.1	Nephelom	etric	
Trace Metals						
			504 600 6	F1 /F	Atamia Abaanatian	
	(A1)		EPA 202.2	•	Atomic Absorption	
	(Sb)		EPA 204.2			
	(As)		EPA 206.2	•		
Barium	(Ba)		EPA 200.7			
	(Be)		EPA 200.7			
	(B)		EPA 200.7			
	(Cd)		EPA 213.2		Atomic Absorption	
	(Ca)		EPA 200.7 EPA 218.2		Atomic Abcomption	
	(Cr)		EPA 210.2 EPA 200.7		Atomic Absorption	
	(Co)		EPA 200.7			
	(Cu)		EPA 200.7			
	(Fe)		EPA 239.2		Atomic Absorption	
	(Pb) (Li)		SM 303A	. I Tame/Turnace	Acomire Absorption	
	(Mg)		EPA 200.7	ICP		
	(Mn)		EPA 200.7			
	(Hg)		EPA 245.1		Atomic Absorption	
	(Mo)		EPA 200.7		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	(Ni)		EPA 249.1		Atomic Absorption	
	(K)		EPA 200.7		,	
	(Se)		EPA 270.2		Atomic Absorption	
	(SiÓ2)		EPA 2 <b>00.7</b>		·	
·	(Ag)		EPA 272.2		Atomic Absorption	
	(Na)		EPA 200.7	ICP	·	
	(T1)		EPA 279.2		Atomic Absorption	
	(Sn)		EPA 282.2	H .	•	
	(V) ´		EPA 200.7			
	(Zn)		EPA 200.7	ICP		

Table IV-1

### DRINKING WATER METHODS (cont'd.)

Parameter	Method	Description
Radio Chemical Analyses		
Gross Alpha	EPA 900.0	Proportional Counter
Gross Beta	EPA 900.0	. #
Gross Alpha & Beta	EPA 900.0	11
Total Radium*	EPA 900.1	Isolation, Proportional Counter
Uranium	EPA 908.0	Distillation, Liquid Scintillation
Tritium	EPA 906.0	Distillation, Liquid Scintillation
Radon	EPA 913.0	Liquid Scintillation

^{*} Can be reported as Radium 226 if less than 3 pCi/liter.

Table IV-2

### WASTEWATER AND GROUNDWATER METHODS

Parameter	Method	Description
Priority Pollutant Analyses		
Chlorinated Pesticides & PCB's GC/MS Method for Volatile Organics GC/MS Base/Neutral & Acids	EPA 608/8080 EPA 624/8240 EPA 625/8270	GC/ECD,liquid-liquid or Soxhlet extr. GC/MS,purge & trap GC/MS,liquid-liquid or Soxhlet extr.
Metals		
Sample preparation Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium & Zinc	EPA 3020 EPA 6010/ 7000's	Digest ICP Flame/Furnace Atompic Absorption
Cyanide Phenols	EPA 335.2 EPA 420.1	Colorimetric Colorimetric
Organic Chemical Analyses		
Purgeable Halocarbons Non-Halogenated Volatile Organics Aromatic Volatile Organics Purgeable Halocarbons &     Aromatic Volatile Organics Phenols Chlorinated Pesticides & PCB's Chlorinated Pesticides PCB's Polynuclear Aromatic Hydrocarbons Organophosphorus Pesticides Chlorinated Herbicides Triazine Pesticides GC/MS Method for Volatile Organics GC/MS Base/Neutral & Acids Base/Neutral fraction Acid fraction Carbamates Total Organic Halogens (TOX) Total Organic Carbon (TOC) Trichloroethylene (TCE) Tetrachloroethylene (PCE) TCE & PCE		GC/PID/Hall, purge & trap GC/PID/Hall, purge & trap GC/PID,purge & trap GC/PID,purge & trap GC/ECD liquid-liquid or Soxhlet extr. " " GC/ECD liquid-liquid or Soxhlet extr. GC/ECD liquid-liquid or Soxhlet extr. GC/NPD liquid-liquid GC/MS purge & trap GC/MS liquid-liquid or Soxhlet extr. " " HPLC/UV liquid-liquid coulometric, Pyrolysis Combustion, IR *GC/PID/Hall purge & trap *GC/MS purge & trap *GC/MS purge & trap

WASTEWATER AND GROUNDWATER METHODS (cont'd.)

Table IV-2

Method	Description
SM 908A	Fermentation, MPN
SM 908C	Fermentation, MPN
SM 907A	Incubation, visual count
EPA 900.0	Proportional counter
	Proportional counter
	Proportional counter Isolation, proportional counter
	Isolation, proportional counter
EPA 906.0	Distillation, liquid scintillation
EPA 913.0	Liquid scintillation
	SM 908A SM 908C SM 907A  EPA 900.0 EPA 900.0 EPA 900.1 EPA 908.0 EPA 906.0

 $[\]star$  Can be reported as Radium 226 if less than 3 pCi/liter.

Table IV-2

### WASTEWATER AND GROUNDWATER METHODS (cont'd.)

Parameter		Method	Description
General Inorganic Chemistry			
Acidity Alkalinity	(CaCO3) (NH3)	EPA 305.1 EPA 310.1	Titration Titration
Ammonia By colorimetric By distillation (low le Bicarbonate Biochemical Oxygen Demand Bromide Carbonate Carbon Dioxide Chemical Oxygen Demand Chloride Chlorine Residual Chlorine Demand Color Cyanide, Total Electrical Conductivity	evel) (HCO3)	EPA 350.1 EPA 350.2 EPA 310.1 EPA 405.1 SM 405 EPA 310.1 SM 406 EPA 410.2 EPA 325.3 SM 407C SM 409A EPA 110.3 EPA 335.2 EPA 120.1	Colorimetric Dist./Colorimetric Colorimetric ISE Colorimetric Titration Titration Colorimetric Titration Titration Titration Visual Colorimetric Conductivity Bridge
Fluoride By electrode By distillation Hardness, total Hydroxide Langelier Index (corrosivi) (langelier index calc. MBAS	(F) (CaCO3) (OH) ity)	EPA 340.2 EPA 340.1 EPA 130.2 EPA 310.1 SM 203 Calc. EPA 425.1	ISE Distillation/ISE Titration Titration Colorimetric
Nitrogen Ammonia Nitrate Nitrite Organic Total Total Kjeldahl Nitroger	(NH3) (NO3) (NO2) (TKN - NH3) (TKN + NO3 + NO2)	EPA 350.1 EPA 353.2 EPA 353.2 Calc. Calc. EPA 351.2 EPA 140.1	Colorimetric Colorimetric Colorimetric
Odor Oil and Grease Oxygen, Dissolved Phenols	(DO)	EPA 413.1 EPA 360.1 EPA 420.1	Gravimetric ISE Colorimetric
Phosphorus Ortho Dissolved-ortho Total Total-dissolved pH	(PO4-P) (PO4-P) (P) (P)	EPA 365.2 EPA 365.2 EPA 365.4 EPA 365.4 EPA 150.1	Colorimetric Colorimetric Colorimetric Colorimetric ISE
Resistivity Sodium Percent Sodium Absorption Ratio (SAR calculation only)	(SAR)	Calc. EPA 200.7 Calc.	ICP

Table IV-2

**Parameter** 

# WASTEWATER AND GROUNDWATER METHODS (cont'd.)

General Inorganic Chemist	cry continued		
Solids/Residue			
Filterable	(TDS)	EPA 1 <b>60.1</b>	Gravimetric
Non-filterable	(Suspended)	EPA 160.2	Gravimetric
Total	, , ,	EPA 16 <b>0.3</b>	Gravimetric
Volatile		EPA 160.4	Gravimetric
Settleable		EPA 1 <b>60.5</b>	Gravimetric
Sulfate	(\$04)	EPA 375.4	Turbidimetric
Sulfide	(H2S)		
Total		EPA 376.1	Methylene Blue
Dissolved		EPA 376.1	Methylene Blue
Tannin & Lignin		SM 513	Colorimetric
Titration - pH adjust	ment	Calc.	North 2 or Audio
Turbidity		EPA 180.1	Nephelometric
Trace Metals			
Sample preparation fo	or metals analysis	EPA 3005/30	20 Digestion
Aluminum (Al)	•	EPA 7020	Flame/Furnace Atomic Absorption
Antimony (Sb)		EPA <b>704</b> 1	n .
Arsenic (As)		EPA <b>7060</b>	11
Barium (Ba)		EPA <b>6010</b>	ICP
Beryllium (Be)		EPA 6010	II
Boron (B)		EPA 6010	# Al . Al
Cadmium (Cd)		EPA 7131	Flame/Furnace Atomic Absorption
Calcium (Ca)		EPA 6010	ICP
Chromium (Cr)		EPA 7191	Flame/Furnace Atomic Absorption
Chromium VI (Cr+6)		EPA 7196	ICD
Cobalt (Co)		EPA 6010	ICP
Copper (Cu)		EPA <b>6010</b> EPA <b>231.</b> 1	Flame/Furnace Atomic Absorption
Gold (Au)		EPA 6010	ICP
Iron (Fe) Lead (Pb)		EPA 7421	Flame/Furnace Atomic Absorption
Lithium (Li)		SM 7430	"
Magnesium (Mg)		EPA 7450	n .
Manganese (Mn)		EPA <b>7460</b>	H
Mercury (Hg)		EPA 7470	Cold Vapor Atomic Absorption
Molybdenum (Mo)		EPA 6010	ICP
Nickel (Ni)		EPA <b>7520</b>	Flame/Furnace Atomic Absorption
Potassium (K)		EPA <b>7610</b>	. "
Selenium (Se)		EPA 7 <b>74</b> 1	II .
Silica (SiÓ2)		EPA <b>6010</b>	ICP
Silver (Ag)		EPA <b>776</b> 1	Flame/Furnace Atomic Absorption
Sodium (Na)		EPA <b>7770</b>	II .
Thallium (Tl)		EPA <b>784</b> 1	н
Tin (Sn)		EPA <b>7870</b>	11
Vanadium (V)		EPA 6010	ICP
Zinc (Zn)		EPA 6010	ICP
	-38-		

Method

Description

Table IV-3

### **HAZARDOUS WASTE METHODS**

Parameter	Method	Description
California Assessment Manual (CAM-TTLC)	Title 22	
Metals analyses		
Sample preparation Sb,As,Se Ba,Be,Cd,Cr,Co,Cu,Pb,Mo,Ni,Ag,Tl,V,Zn Hg	EPA 3050 EPA 7000's EPA 6010/ 7000's EPA 7470	Digestion Flame/Furnace Atomic Absorption ICP Flame/Furnace Atomic Absorption Cold Vapor Atomic Absorption
Chromium VI (Cr+6)	EPA 7196	Colorimetric
Fluoride (distillation)	EPA 340.1	Distillation, ISE
Organic analyses		
2,4-D & 2,4,5-TP (Silvex) PCP TCE Aldrin, BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Endosulfan, Heptachlo Lindane, Methoxychlor, PCB's, Toxaphene		GC/ECE, Soxhlet Extraction  GC/PID/Hall, purge & trap GC/ECD, Soxhlet Extraction
Waste Extraction Test (WET-STLC)	Title 22	
Sample Preparation (citrate buffer extract	cion)	
Metals analyses		
<pre>Sb,As,Se Ba,Be,Cd,Cr,Co,Cu,Pb,Mo,Ni,Ag,T1,V,Zn Hg</pre>	EPA 7000's EPA 6010/ 7000's EPA 7471	Flame/Furnace Atomic Absorption ICP Flame/Furnace Atomic Absorption
Chromium VI (Cr+6)	EPA 7196	Colorimetric
Fluoride (distillation)	EPA 340.1	Distillation/ISE
Organic analyses		
2,4-D & 2,4,5-TP (Silvex) PCP TCE Aldrin, BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Endosulfan, Heptachlo Lindane, Methoxychlor, PCB, Toxaphene	EPA 8150 EPA 8150 EPA 8010 EPA 8080	GC/ECE, Soxhlet Extraction  GC/PID/Hall, purge & trap 's GC/ECD, Soxhlet Extraction

Table IV-3

## HAZARDOUS WASTE METHODS (cont'd.)

Parameter	Method	Description
TCLP (Toxicity Characteristic Leaching Procedure)	RCRA	
Extraction		
ZHE (Zero Headspace Extraction) TCLP Extraction for all non-volatiles	EPA 1311	
Metals		
Sample preparation Arsenic, Barium, Cadmium, Chromium, Lead Mercury, Selenium & Silver	EPA 3020 EPA 6010/ 7000's	Digestion ICP Flame/Furnace Atomic Absorption
Organic Analyses		
Volatiles from ZHE Base-Neutral & Acids Herbicides Pesticides	EPA 8240 EPA 8270 EPA 8150 EPA 8080	GC/MS, purge & trap GC/MS, Soxhlet Extraction GC/ECD, Soxhlet Extraction GC/ECD, Soxhlet Extraction
EP Toxicity	RCRA	
Extraction	EPA 1310	
Metals .		
Arsenic, Barium, Cadmium, Chromium, Lead Mercury, Selenium & Silver	EPA 6010/ 7000's	ICP Flame/Furnace Atomic Absorption
Organic Analyses		
Herbicides Pesticides	EPA 8150 EPA 8080	GC/ECD, Soxhlet Extraction GC/ECD, Soxhlet Extraction
ICAP Scan		
Aluminum, Antimony, Arsenic, Boron, Cadmium, Barium, Beryllium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Sodium, Thallium, Vanadium, Zinc	EPA 6010/ 7000's	ICP Flame/Furnace Atomic Absorption

Table IV-3

# HAZARDOUS WASTE METHODS (cont'd.)

Parameter		Method	Description
Underground Storage Tank Analys	is		
Total Petroleum Hydrocarbons Total Petroleum Hydrocarbons	(TPH) (TPH)		GC/FID, purge & trap IR, liquid-liquid
(I.R. Spectroscopy) Benzene, Toluene,	(BTEX)	EPA 8020	GC/PID, purge & trap
Ethylbenzene, Xylene TPH and BTEX		EPA <b>8015M</b> / 8 <b>020</b>	GC/FID, purge & trap
Ethylene Dibromide	(EDB)	EPA 8010	GC/PID/Hall, purge & trap
and Ethylene Dichloride Total Lead Soluble Lead	(EDC)	EPA 7420 EPA 7420	Flame/Furnace Atomic Absorption Flame/Furnace Atomic Absorption
Organic Chemical Analysis			
Purgeable Halocarbons Non-Halogenated Volatile Organ Aromatic Volatile Organics	ics	EPA 8010 EPA 8015 M EPA 8020	GC/PID/Hall, purge & trap GC/FID purge & trap
Purgeable Halocarbons & Aromatic Volatile Organics Phenols		EPA 8010 & 8020 EPA 8040	GC/PID/Hall, purge & trap GC/PID, purge & trap
Chlorinated Pesticides & PCB's Chlorinated Pesticides		EPA 8080 EPA 8080	GC/ECD, liquid-liquid GC/ECD, liquid-liquid or Soxhlet extr.
PCB's Polynuclear Aromatic Hydrocarb	ons	EPA 8080 EPA 8100	
Organophosphorus Pesticides Chlorinated Phenoxy Herbicides		EPA 8140 EPA 8150	GC/FPD, liquid-liquid or Soxhlet extr. GC/ECE, liquid-liquid or Soxhlet extr.
Triazine Pesticides GC/MS Method for Volatile Orga		EPA 619 EPA 8240	GC/NPD, liquid-liquid
GC/MS Base/Neutral & Acids Base/Neutral fraction		EPA 8270 EPA 8270	GC/MS, liquid-liquid or Soxhlet extr.
Acid fraction Carbamates		EPA 8270 EPA 632	" HPLC/UV, liquid-liquid
Total Organic Halogens (TOX) Total Organic Carbon (TOC)		EPA 9020 EPA 9060	Coulometric, Pyrolysis Combustion, IR
Total Organic Carbon (TOC) Trichloroethylene (TCE)		EPA 415.1	GC/MS, purge & trap
Tetrachloroethylene (PCE) TCE & PCE		EPA 8010/8240 EPA 8010/8240	

Table IV-3

### HAZARDOUS WASTE METHODS (cont'd.)

Parameter	Method	Description
Hazardous Waste Characterization	RCRA/Title 22	
Corrosivity		
Aqueous sample (pH) Nonaqueous sample (1:1 DI water pH)	EPA 9040 EPA 9045	ISE ISE
Ignitability		
Aqueous (Flashpoint) Nonaqueous (Flammability)	EPA 1010 EPA 1020	Flashpoint Flashpoint
Reactivity		Observation
Reaction with water Reaction with dilute acid Reaction with dilute base Reaction with oxidizing agent Reaction with reducing agent Sulfide generation Cyanide generation		

#### Toxicity Bioassay

Title 22

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Calif. Acute Toxicity - 96 Hr. % Survival
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Screen - 2 conc. + control - 20 fish/conc.
Definitive - 5 conc. + control - 20 fish/conc.
```

Table IV-4

#### **SLUDGE METHODS**

Parameter		Method	Description		
General Inorganic Chemistry					
Cyanide, total Fluoride Moisture	(CN) (F)	EPA 335.2 EPA 340.1 ASA/UL	Distillation/Colorimetric Distillation/Colorimetric Gravimetric		
Nitrogen Ammonia Nitrate Total	(NH3) (NO3) (TKN+NO3+NO2)	EPA 350.1 EPA 353.2 EPA 351.1	Colorimetric Colorimetric Colorimetric		
Oil and grease Separatory fo Soxhlet pH Phosphorus, Tota Sulfide		EPA 413.1 EPA 413.2 EPA 9045 EPA 365.4 EPA 376.1	Gravimetric IR ISE Colorimetric Colorimetric		
Trace Metals					
Aluminum (Al Antimony (St Arsenic (As Barium (Ba Beryllium (Ba Boron (B) Cadmium (Co Chromium (C)	p) s) s) a) d) c+6) b) s) s) s) s) s) s) s) s) s)	S EPA 3050 EPA 6010 EPA 7041 EPA 7060 EPA 6010 EPA 6010 EPA 6010 EPA 6010 EPA 6010 EPA 7196 EPA 6010 EPA 7420 EPA 7470 EPA 6010 EPA 7741 EPA 7760 EPA 7760 EPA 7841 EPA 6010 EPA 6010	Digestion ICP Furnace/Flame Atomic Absorption Furnace/Flame Atomic Absorption ICP " " Furnace/Flame Atomic Absorption ICP " Furnace/Flame Atomic Absorption ICP " Furnace/Flame Atomic Absorption " ICP " Furnace/Flame Atomic Absorption " ICP "		

#### V. Quality Assurance Objectives

The quality assurance plan for laboratory operations has two main objectives. Primarily, it supplies a mechanism for continual control and assessment of data quality. Secondly, historical quality control data may be used to define data quality in terms of accuracy and precision.

The quality control objectives for accuracy, precision, and Method Detection Limit (MDL) are listed in Tables V-1 to V-3. Accuracy values are expressed as a percentage of a true value, and serve as a reflection of the total measurement error (random and systematic). Accuracy is usually measured by determination of the percent recovery of known target analyte addition to a given sample or representative sample matrix.

Precision values are expressed as relative percent difference (RPD) between two duplicate measurements, and serve as a reflection of the variability in measurement replication.

The Method Detection Limit (MDL) reflects the minimum concentration of a given analyte in a given matrix that can be determined and reported with 99 percent confidence that the analyte concentration is above zero. Detection limit studies are conducted annually to ensure that the objectives listed in this section are met or exceeded.

Table V-4 and V-5 list key ions and ion abundance for the calibration criteria compounds (BFB and DFTPP, respectively) used in GC-MASS Spectrometry methods.

FGL uses the following equations for quality control calculations:

% Recovery = 
$$\frac{Actual\ Value}{Theoretical\ Value}$$
 X 100

The relative percent difference (RPD) in duplicate samples is calculated by:

$$RPD = \frac{(Value(1) - Value(2)) \times 100\%}{(Value(1) + Value(2))/2}$$

and sample standard deviation (when applicable) may be calculated by:

$$\begin{array}{cccc}
i &= n \\
\leq & & (X_i - \bar{X})^2 \\
\underline{i &= 1} & & & \\
& & n - 1
\end{array}$$

Where:  $X_i = \text{The } i^{th} \text{ sample observation}$ 

 $\overline{X}$  = The sample average

n = The total number of sample observations

For general mineral analysis, the anion and cation balances should be determined. If the difference is more than 0.3 meq/L or 5 percent (whichever is greater), the analysis should be rechecked.

For GC/MS analyses, the overall precision and accuracy of recovery is monitored by the addition of internal standards to every sample.

#### FGL Analytical Review Policy

Chemists/analysts will review each others data on an ongoing basis and note the review of data by dating and initialling the work or section reviewed in the analyst's notebook. This internal checking of data by the chemist will be confirmed by the QA/QC Director. All work completed by a technician is checked by the technician's supervisor before publishing.

Analytical results are recorded in the FGL Laboratory Information Management System (LIMS) to show the date on which the data was obtained and the analyst responsible for the data. Precision and accuracy (duplicates and spikes) data is also recorded by the analyst into the FGL LIMS system. The acceptance limits are stored in the LIMS system as well. The LIMS system required that the data meet the acceptance criteria and be checked by a second analyst prior to release for reporting. If matrix interference is the cause for data being out of acceptance limits, the LIMS system will also require that a supervisor release the data with a comment explaining the reason for the out of control data. System security is achieved by the use of personalized passwords and restricted electronic access according to personal responsibilities.

TABLE V-1

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Bromodichloromethane Bromoform Chloroform Dibromochlormethane	70-130 70-130 70-130 70-130	20.0 20.0 20.0 20.0	0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L
Method EPA 502.2			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Benzene Bromobenzene Bromochloromethane Bromodichloromethane Bromoform Bromomethane n-Butylbenzene sec-Butylbenzene tert-Butylbenzene Carbon Tetrachloride Chlorobenzene Chlorotoluene Chlorotoluene 4-Chlorotoluene DBCP Dibromochlormethane 1,2-Dibromoethane Dibromomethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,4-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethylene cis-1,2-Dichloroethylene trans-1,2-Dichloroethylene trans-1,2-Dichloropropane 1,3-Dichloropropane 1,3-Dichloropropane 1,3-Dichloropropene cis-1,3-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene Ethyl Benzene	37-151 50-150 50-150 35-155 45-169 D-242 50-150 50-150 50-150 51-138 D-273 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.050 ug/L

#### TABLE V-1 (cont'd.)

## QUALITY CONTROL ACCEPTANCE CRITERIA for ORGANIC METHODS

#### Method EPA 502.2

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Hexachlorobutadiene Isopropylbenzene p-Isopropyltoluene Methylene Chloride Naphthalene n-Propylbenzene Styrene 1,1,1,2-Tetrachlorethane 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,2,3-Trichlorobenzene 1,1,1-Trichlorobenzene 1,1,1-Trichloroethane Trichlorethylene Trichlorofluoromethane 1,2,3-Trichloropropane 1,1,2-Trichlorotrifluoroethane 1,2,3-Trichlorotrifluoroethane 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Vinyl Chloride Xylenes m,p Xylenes o	50-150 50-150 D-221 50-150 50-150 50-150 46-157 64-148 47-163 50-150 50-150 52-162 52-162 52-162 52-150 71-157 17-181 50-150 50-150 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.050 ug/L
Method EPA 504			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
DBCP EDB	70-130 70-130	30.0 30.0	0.001 ug/L 0.002 ug/L

Method EPA 505
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CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Alachlor Aldrin Chlordane Dieldrin Endrin Heptachlor Heptachlor Epoxide Hexachlorobenzene Lindane Methoxychlor Toxaphene PCB 1016 PCB 1221 PCB 1232 PCB 1242 PCB 1248 PCB 1254 PCB 1260	50-150 42-122 45-119 36-146 30-147 34-111 37-142 50-150 32-127 50-150 41-126 50-114 15-178 10-215 39-150 38-158 29-131 8-127	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.040 ug/L 0.005 ug/L 0.050 ug/L
Method EPA 507			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,3-Dimethyl-2-nitrobezene 9-Nitroanthracene Atrazine	50-150 50-150 70-130	30.0 30.0 30.0	0.000 ug/L 0.000 ug/L 0.100 ug/L
Simazine Molinate Thiobencarb Bromocil Diazinon Prometryne Dimethoate	70-130 70-130 70-130 70-130 70-130 70-130 70-130	30.0 30.0 30.0 30.0 30.0 30.0	0.100 ug/L 0.200 ug/L 0.100 ug/L 0.500 ug/L 0.200 ug/L 0.200 ug/L
Molinate Thiobencarb Bromocil Diazinon Prometryne	70-130 70-130 70-130 70-130 70-130 70-130	30.0 30.0 30.0 30.0 30.0	0.100 ug/L 0.200 ug/L 0.100 ug/L 0.500 ug/L 0.200 ug/L 0.200 ug/L
Molinate Thiobencarb Bromocil Diazinon Prometryne Dimethoate	70-130 70-130 70-130 70-130 70-130 70-130	30.0 30.0 30.0 30.0 30.0	0.100 ug/L 0.200 ug/L 0.100 ug/L 0.500 ug/L 0.200 ug/L 0.200 ug/L

Method EFA 313.1	Method	EPA	515	. 1
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CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
2,4,5-T 2,4-D 2,4,5-TP (Silvex) Bentazon Dalapon Dinoseb Pichloram	30-150 30-150 30-150 30-150 30-150 30-150 30-150	30.0 30.0 30.0 30.0 30.0 30.0	0.100 ug/L 1.000 ug/L 0.100 ug/L 0.200 ug/L 0.100 ug/L 0.100 ug/L 0.100 ug/L
Method EPA 524.2			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,2-Dichloroethane-d4 Toluene-d8 BFB Benzene Bromobenzene Bromochloromethane Bromodichloromethane Bromoform Bromomethane n-Butylbenzene sec-Butylbenzene tert-Butylbenzene Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform Chloromethane 2-Chlorotoluene Dibromochlormethane Dibromomethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethylene cis-1,2-Dichloroethylene trans-1,2-Dichloroethylene	76-114 88-110 86-115 37-151 50-150 50-150 35-155 45-169 D-242 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.000 ug/L 0.000 ug/L 0.000 ug/L 0.050 ug/L

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,2-Dichloropropane 1,3-Dichloropropane 2,2-Dichloropropane 1,1-Dichloropropene cis-1,3-Dichloropropene trans-1,3-Dichloropropene Ethyl Benzene Hexachlorobutadiene Isopropylbenzene p-Isopropyltoluene Methylene Chloride Naphthalene n-Propylbenzene Styrene 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,2,3-Trichlorobenzene 1,1,1-Trichlorobenzene 1,1,1-Trichloroethane Trichlorofluoromethane Trichlorofluoromethane 1,2,3-Trichloropropane 1,1,2-Trichlorotrifluoroethane 1,2,3-Trichlorotrifluoroethane 1,2,3-Trichlorotrifluoroethane 1,2,5-Trimethylbenzene 1,3,5-Trimethylbenzene 1,3,5-Trimethylbenzene Vinyl Chloride Xylenes m,p Xylenes o Acetone 2-Butanone (MEK) Carbon Disulfide 1,2-Dibromo-3-chloropropane 1,2-Dibromo-3-chloropropane 1,2-Dibromo-4-CEDB)	% RECOVERED  D-210 50-150 50-150 50-150 D-227 17-183 37-162 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	RPD 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.	0.050 ug/L
2-Hexanone 4-Methyl-2-pentanone (MIBK) Vinyl Acetate	50-150 50-150 50-150	30.0 30.0 30.0	0.050 ug/L 0.050 ug/L 0.050 ug/L

Method EPA 525			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Perylene-d12 bis(2-Ethylhexly)phthalate	50-150 29-137	30.0 30.0	0.100 ug/L 0.100 ug/L
Method EPA 531			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Aldicarb Sulfone Aldicarb Sulfoxide Oxymal Methomyl 3-Hydroxycarbofuran Aldicarb Propoxur Carbofuran Carbaryl 1-Napthol Methiocarb	70-130 70-130 70-130 70-130 70-130 70-130 70-130 70-130 70-130 70-130	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 2.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 2.000 ug/L
Method EPA 547			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Glyphosate	70-130	20.0	7.000 ug/L

#### Method EPA 601

HEEMOG ELIT GOT			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Bromodichloromethane Bromoform Bromomethane Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform Chloromethane Dibromochlormethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene Dichlorodifluoromethane 1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethylene trans-1,2-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene Methylene Chloride 1,1,2,2-Tetrachlorethane Tetrachloroethylene 1,1,1-Trichlorethane Trichlorethylene Trichlorofluoromethane Trichlorofluoromethane Vinyl Chloride	42-172 13-159 D-144 43-143 38-150 46-137 49-133 D-193 24-191 D-208 7-187 42-143 50-150 47-132 51-147 28-167 38-155 44-156 22-178 22-178 22-178 25-162 50-150 26-162 41-138 39-139 35-146 21-156 28-163	20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0	0.050 ug/L

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Benzene Toluene Ortho Xylene Para Xylene Meta Xylene Chlorobenzene Ethyl Benzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene	39-150 46-148 50-150 50-150 50-150 55-135 32-160 37-154 50-141 42-143 -52-	20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0	0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L 0.050 ug/L

### TABLE V-1 (cont'd.) QUALITY CONTROL ACCEPTANCE CRITERIA for ORGANIC METHODS

Met	hod	EPA	604

ACCURACY RECOVERED  23-134 39-135 42-109 D-181 D-191 50-150 50-150 29-182 29-182 22-147 14-176 5-112	PRECISION RPD 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.	MDL  1.000 ug/L 1.000 ug/L 1.000 ug/L 5.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 2.000 ug/L 2.000 ug/L
39-135 42-109 D-181 D-191 50-150 50-150 29-182 29-182 22-147 14-176 5-112	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	1.000 ug/L 1.000 ug/L 5.000 ug/L 5.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 2.000 ug/L
37-144 37-144	30.0 30.0 30.0	1.000 ug/L 1.000 ug/L 1.000 ug/L
ACCURACY % RECOVERED	PRECISION RPD	MDL
50-150 24-154 42-122 37-134 17-147 19-140 45-119 31-141 30-145 30-145 25-160 25-160 25-160 25-160 36-146 45-153 D-202 26-144 30-147 50-150 34-111 37-142 32-127 50-150 41-126 50-114 15-178 10-215 39-150 38-158	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.000 ug/L 0.000 ug/L 0.020 ug/L
	37-144 37-144 ACCURACY RECOVERED 50-150 24-154 42-122 37-134 17-147 19-140 45-119 31-141 30-145 25-160 25-160 25-160 25-160 36-146 45-153 D-202 26-144 30-147 50-150 34-111 37-142 32-127 50-150 41-126 50-114 15-178 10-215 39-150	37-144 37-144 30.0  ACCURACY RECOVERED RPD  50-150 30.0 24-154 30.0 42-122 30.0 37-134 30.0 17-147 30.0 19-140 30.0 45-119 30.0 31-141 30.0 31-141 30.0 31-141 30.0 30-145 30.0 25-160 30.0 25-160 30.0 25-160 30.0 25-160 30.0 25-160 30.0 36-146 30.0 45-153 30.0 25-160 30.0 36-146 30.0 36-146 30.0 36-147 30.0 36-147 30.0 37-142 30.0 31-111 30.0 37-142 30.0 31-111 30.0 37-142 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0 31-111 30.0

TABLE V-1 (cont'd.)

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,3-Dimethyl-2-nitrobe 9-Nitroanthracene Azinphos Methyl Bolstar Chlorpyrifos Coumaphos Demeton-o,s Diazinon Dichlorvos Disulfoton Ethoprop Fensulfoton Fenthion Merphos Mevinphos Naled Parathion Methyl Phorate Ronnel Stirophos Tokuthion Trichlornate	50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.000 ug/L 0.000 ug/L 0.200 ug/L
Method EPA 615 CONSTITUENT	ACCURACY	PRECISION	MDL
2,4,5-T 2,4-D 2,4,5-TP (Silvex)	% RECOVERED 50-150 50-150 50-150	RPD 30.0 30.0 30.0	0.100 ug/L 1.000 ug/L 0.100 ug/L

TABLE V-1 (cont'd.)

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,2-Dichloroethane-d4 Toluene-d8 BFB Acetone Benzene Bromodichloromethane Bromomethane Carbon Disulfide Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform Chloromethane Dibromochlormethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethylene	% RECOVERED  76-114 88-110 86-115 50-150 37-151 35-155 45-169 D-242 50-150 70-140 37-160 14-230 51-138 D-273 53-149 50-150 50-150 50-150 59-155 49-155 D-234	RPD 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.	N/A N/A N/A 5.000 ug/L 0.050 ug/L 0.250 ug/L 0.250 ug/L 0.250 ug/L 0.250 ug/L 0.050 ug/L 0.250 ug/L
trans-1,2-Dichloroethylene 1,2-Dichloropropane cis-1,3-Dichloropropene trans-1,3-Dichloropropene Ethanol Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene	54-156 D-210 D-227 17-183 50-150 37-162 50-150 D-221 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.250 ug/L 0.250 ug/L 0.250 ug/L 0.250 ug/L 5.000 ug/L 2.500 ug/L 0.250 ug/L 5.000 ug/L 0.250 ug/L 0.250 ug/L
1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichlorethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes Acrolein Acrylonitrile	46-157 64-148 47-163 52-162 52-150 71-157 17-181 50-150 D-251 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.250 ug/L 5.000 ug/L 0.250 ug/L 10.000 ug/L

#### TABLE V-1 (cont'd.)

## QUALITY CONTROL ACCEPTANCE CRITERIA for ORGANIC METHODS

Method EPA 625
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CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Naphthalene Nitrobenzene N-Nitrosodimethylamine N-Nitrosodi-N-propylamine N-Nitrosodiphenylamine 2-Nitroanaline 3-Nitroanaline 4-Nitroanaline Phenanthrene Pyrene 1,2,4-Trichlorbenzene 2-Chlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 4-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorphenol 2,4,6-Trichlorphenol Azobenzene Benzidine Benzoic Acid	21-133 35-180 50-150 D-230 50-150 50-150 50-150 50-150 52-115 44-142 23-134 39-135 42-109 D-181 D-191 50-150 50-150 29-182 11-114 22-147 14-176 5-112 50-150 37-144 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 5.000 ug/L 5.000 ug/L 1.000 ug/L 5.000 ug/L 5.000 ug/L 5.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 1.000 ug/L 5.000 ug/L 5.000 ug/L

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL	
Benzylchloride bis(2-Chloroisopropyl)ether Bromobenzene Bromochloromethane Bromodichloromethane Bromoform Bromomethane Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform	50-150 50-150 50-150 50-150 42-172 13-159 0-144 43-143 38-150 46-137 49-133	20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0	0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500 0.500	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg

#### Method EPA 8010

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1-Chlorohexane Chloromethane 2-Chlorotoluene Chlortoluene DBCP Dibromochlormethane 1,2-Dibromoethane Dibromomethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethylene cis-1,2-Dichloroethylene trans-1,2-Dichloroethylene trans-1,2-Dichloropropane 1,2-Dichloropropane 2,2-Dichloropropane 2,2-Dichloropropane 1,1-Dichloropropene cis-1,3-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Tetrachlorothane 1,1,2,2-Tetrachlorethane 1,1,2,2-Tetrachlorethane 1,1,2-Trichlorobenzene 1,1,1-Trichlorethane 1,2,4-Trichlorothane 1,1,2-Trichlorethane 1,1,2-Trichlorethane 1,1,2-Trichlorethane 1,1,1-Trichlorethane 1,1,2-Trichlorothane 1,1,2-Trichlorobenzene	50-150 D-193 50-150 50-150 50-150 50-150 D-208 7-187 42-143 47-132 51-147 28-167 50-150 38-155 44-156 50-150 50-150 50-150 22-178 22-178 50-150 25-162 50-150 25-162 50-150 26-162 50-150 50-150 26-162 50-150 50-150 26-162 50-150 50-150 26-162 50-150 50-150 50-150 26-162 50-150 50-150	20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0	gggggggggggggggggggggggggggggggggggggg
Vinyl Chloride	20 100	20.0	= 1000 mg/ Ng

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL	
Acetone Ethanol Ethyl Acetate Ethyl ether Methyl ethyl keton Methyl isobutyl ketone 2-Propanol (Isopropyl Alcohol)	50-150	40.0	0.500	mg/kg
	50-150	40.0	0.500	mg/kg
	50-150	40.0	0.500	mg/kg
	50-150	40.0	0.500	mg/kg
	50-150	40.0	0.500	mg/kg
	50-150	40.0	0.500	mg/kg

TABLE V-1 (cont'd.)

#### Method EPA 8020

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL	
Benzene Toluene Ortho Xylene Para Xylene Meta Xylene Chlorobenzene Ethyl Benzene 1,2-Dichlorobenzene	39-159 46-148 50-150 50-150 50-150 55-135 32-160 37-154	20.0 20.0 20.0 20.0 20.0 20.0 20.0	0.001 0.001 0.001 0.001 0.001 0.001 0.001	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg
<pre>1,3-Dichlorobenzene 1,4-Dichlorobenzene</pre>	50-141 42-143	20.0 20.0	0.001 0.001	mg/kg mg/kg

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
2-sec-Butyl-4-6-dinitrophenol 2-Chlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol 2,4-Dinitrophenol 2-Methyl-4,6-Dinitrophenol 2-Methylphenol 4-Methylphenol 4-Nitrophenol 4-Nitrophenol 4-Chloro-3-methylphenol Pentachlorophenol Phenol 2,3,4,6-Tetrachlorophenol 2,3,5,6-Tetrachlorophenol 2,3,5-Trichlorophenol 2,3,6-Trichlorophenol 2,4,5-Trichlorophenol	50-150 23-134 39-135 42-109 D-191 D-181 50-150 29-182 29-182 29-182 22-147 14-176 5-112 50-150 50-150 37-144 37-144 37-144	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.050 mg/kg 0.050 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.050 mg/kg 0.050 mg/kg 0.050 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg 0.010 mg/kg
2,4,6-Trichlorophenol	37-144	30.0	0.010 mg/kg

#### Method EPA 8080

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Hexachlorobenzene Dibutylchlorendate Aldrin Alpha BHC Beta BHC Delta BHC Chlordane o,p - DDD p,p - DDD p,p - DDE p,p - DDT p,p - DDT Dieldrin Endosulfan II Endosulfan Sulfate Endrin Endrin Aldehyde Heptachlor Heptachlor Heptachlor Epoxide Lindane Methoxychlor Toxaphene PCB 1016 PCB 1221 PCB 1232 PCB 1242 PCB 1248 PCB 1254 PCB 1250	50-150 20-150 34-132 37-134 17-147 19-140 45-119 31-141 30-145 30-145 23-134 23-134 45-153 D-202 26-144 42-139 50-150 35-130 37-142 46-127 50-150 41-126 50-114 15-178 10-215 39-150 38-158 29-131 8-127	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 50.0 50.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	N/A N/A 0.020 mg/kg 0.0200 mg/kg

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,3-Dimethyl-2-nitrobenzene 9-Nitroanthracene Azinphos Methyl Bolstar Chlorpyrifos Coumaphos Demeton-o,s Diazinon Dichlorvos	50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 -60-	30.0 30.0 30.0 30.0 30.0 30.0 30.0	N/A N/A 0.002 mg/kg

#### TABLE V-1 (cont'd.)

Method EPA 8140			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Disulfoton Ethoprop Fensulfoton Fenthion Merphos Mevinphos Naled Parathion Methyl Phorate Ronnel Stirophos Tokuthion Trichlornate	50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.002 mg/kg
Method EPA 8150			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
2,4,5-T 2,4-D 2,4,5-TP (Silvex)	50-150 50-150 50-150	30.0 30.0 30.0	0.001 mg/kg 0.010 mg/kg 0.001 mg/kg
Method EPA 8240			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,2-Dichloroethane-d4 Toluene-d8 BFB Acetone Benzene Bromodichloromethane Bromomethane Carbon Disulfide Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform Chloromethane Dibromochlormethane	70-121 81-117 74-121 50-150 66-142 35-155 45-169 D-242 50-150 70-140 60-133 14-230 51-138 D-273 53-149 -61-	30.0 30.0 30.0 21.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	N/A N/A N/A 0.500 mg/kg 0.005 mg/kg 0.025 mg/kg

Method EPA 8240			
CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethylene trans-1,2-Dichloroethylene 1,2-Dichloropropane cis-1,3-Dichloropropene trans-1,3-Dichloropropene trans-1,3-Dichloropropene Ethanol Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes Acrolein Acrylonitrile	50-150 50-150 50-150 59-172 49-155 D-234 54-156 D-210 D-227 17-183 50-150 37-162 50-150 50-150 50-150 50-150 50-150 50-150 62-137 17-181 50-150 D-251 50-150 50-150 50-150 50-150	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	0.025 mg/kg
Method EPA 8270 CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
	/U INCOVERED	11. 0	

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol Acenaphthene Acenaphthylene Aniline Anthracene	30-115 23-120 18-137 25-121 24-113 19-122 31-137 33-145 50-150 27-133 -62-	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	N/A N/A N/A N/A N/A N/A 0.100 mg/kg 0.100 mg/kg 0.500 mg/kg 0.100 mg/kg

CONSTITUENT	ACCURACY % RECOVERED	PRECISION RPD	MDL
Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(g,h,i)perylene Benzylalcohol bis(2-Chloroethoxy)methane bis(2-Chloroethyl)ether bis(2-Chloroisopropyl)ether bis(2-Ethylhexly)phthalate 4-Bromophenylphenylether Butylbenzylphthalate Chloroaniline Chloronaphthalene Chlorophenylphenylether Chrysene Dibenzo(a,h)anthracene Dibenzofuran 1,2-Dichlorbenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 3,3'-Dichlorobenzene 1,4-Dichlorobenzidine Diethylphthalate Dimethylphthalate Dinn-butylphthalate Dinn-octylphthalate 2,4-Dinitrotoluene 2,6-Dinitrotoluene Di-n-octylphthalate Fluoranthene Fluorene Hexachlorobenzene Hexachlorobenzene Hexachlorobenzene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachloroethane Indeno(1,2,3-c,d)pyrene Isophorone 2-Methylnaphthalene	33-143 17-163 24-159 11-162 D-219 50-150 33-184 12-158 36-166 29-137 65-114 D-152 50-150 60-180 25-158 17-168 D-227 50-150 32-129 D-172 28-104 8-213 D-114 D-112 1-118 28-100 50-158 4-146 26-137 59-121 50-150 21-196 50-150	RPD 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.	0.100 mg/kg 0.100 mg/kg
Naphthalene Nitrobenzene N-Nitrosodimethylamine N-Nitrosodi-N-propylamine N-Nitrosodiphenylamine 2-Nitroanaline	21-133 35-180 50-150 41-126 50-150 50-150	30.0 30.0 30.0 38.0 30.0 30.0	0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.500 mg/kg
3-Nitroanaline 4-Nitroanaline Phenanthrene	50-150 50-150 50-150 54-120 -63-	30.0 30.0 30.0	0.500 mg/kg 0.500 mg/kg 0.100 mg/kg

TABLE V-1 (cont'd.)

CONSTITUENT		ACCURACY % RECOVERED	PRECISION RPD	MDL
Pyrene 1,2,4-Trichlorbenzene 2-Chlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorphenol 2,4,6-Trichlorphenol Azobenzene Benzidine Benzoic Acid		35-142 38-107 25-102 39-135 42-109 D-181 D-191 50-150 50-150 29-182 11-114 26-103 17-109 26-90 50-150 37-144 50-150 50-150 50-150	36.0 23.0 50.0 30.0 30.0 30.0 30.0 30.0 30.0 3	0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.500 mg/kg 0.500 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.100 mg/kg 0.500 mg/kg
Method TOC				
CONSTITUENT		ACCURACY % RECOVERED	PRECISION RPD	MDL
TOC TOC	415.1 9060	80-120 80-120	20.0 20.0	0.300 mg/L 3.000 mg/kg
Method TOX				
CONSTITUENT		ACCURACY % RECOVERED	PRECISION RPD	MDL
TOX	9020	80-120	20.0	0.500 ug/L

TABLE V-1 (cont'd.)

Method UGSTA-
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CONSTITUENT	9	ACCURACY % RECOVERED	PRECISION RPD	MDL	
Benzene Ethyl Benzene Toluene Xylene TPH-Gas TPH-Desiel TPH-By IR EDB Total Lead Organic Lead	602 602 602 8015 8015M 418.1 624 7421 DHS/LUFT	39-150 32-160 46-148 50-150 70-130 70-130 50-150 50-150 75-125 50-150	20.0 20.0 20.0 20.0 40.0 40.0 20.0 20.0	0.050 0.050 0.001 0.001 0.050 0.050 0.050 0.050 5.000	ug/L ug/L ug/L mg/L mg/L mg/L ug/L ug/L

#### Method UGSTA-S

CONSTITUENT	9	ACCURACY 6 RECOVERED	PRECISION RPD	MDL	
Benzene	8020	39-159	20.0	0.001	mg/kg
Ethyl Benzene	8020	32-160	20.0	0.001	mg/kg
Toluene	8020	46-148	20.0	0.001	mg/kg
Xylene	8020	50-150	20.0	0.001	mg/kg
TPH-Gas	8015	35-100	40.0	0.500	mg/kg
TPH-Desiel	8015M	35-100	40.0	0.500	mg/kg
TPH-By IR	418.1	50-150	20.0	1.000	mg/kg
EDB	8010	50-150	20.0	0.500	mg/kg
Total Lead	7420	75-125	20.0	4.000	mg/kg
Soluble Lead	7420	30-100	20.0	0.400	mg/kg
Organic Lead	DHS/LUFT	50-150	20.0	0.400	mg/kg

TABLE V-3

CONSTITUENT	METHOD	Accuracy % Recovered	Precision RPD	n MDL	
Gross Alpha	900.0	80-120	20.0	0.100	pCi/L
Gross Beta	900.0	80-120	20.0	0.100	pCi/L
Radon	913.0	80-120	20.0	10.000	pCi/L
Strontium 90	905.0	80-120	20.0	1.000	pCi/L
Total Radium	900.1	80-120	20.0	0.100	pCi/L
Tritium	906.0	80-120	20.0	200.000	pCi/L
Uranium	908.0	80-120	20.0	0.100	pCi/L

	METUOD	Accuracy	Precision	MDI
CONSTITUENT	METHOD	% Recovered	ארט	ויוטע
Moisture % Solids Alkalinity (as CaCO3) Alkalinity (as CaCO3) Alkalinity (as CaCO3) Aluminum Aluminum Aluminum Ammonia Ammonia-N Ammonia-N Ammonium Nitrogen Antimony Antimony Antimony Arsenic Arsenic Arsenic BOD - Soluble Barium Barium Barium Beryllium Beryllium Beryllium Beryllium Beryllium Beryllium Boron	METHOD  ASA/UL 310.0 310.0 310.0 6010 7021 202.2 350.1 350.1 350.1 350.1 7041 7041 204.2 7060 206.2 405.1 405.1 6010 200.7 6010 200.7 310.1 310.1 6010 200.7 310.1 310.1 6010 200.7 410.2 410.2 6010 7131 213.2 6010	% Recovered  NA NA NA NA NA 70-130 75-125 80-120 70-130 80-120 70-130 80-120 70-135 65-135 75-125 65-135 75-125 80-120 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 70-130 80-120 75-125 80-120 75-125 80-120 75-125 80-120	RPD 30.0 30.0 20.0 30.0 20.0 30.0 20.0 30.0 20.0 30.0 20.0 30.0 20.0 2	MDL  N/A  N/A  0.100 mg/L  0.100 mg/kg  0.100 mg/kg  0.005 mg/L  5.000 mg/L  0.100 mg/L  0.100 mg/L  0.100 mg/L  0.100 mg/kg  0.100 mg/kg  0.100 mg/kg  0.010 mg/kg  0.010 mg/L  0.005 mg/L  0.005 mg/L  0.000 mg/L  0.100 mg/L  0.100 mg/L  0.100 mg/L  0.100 mg/L  0.000 mg/L
Calcium	6010	70-130	30.0	5.000 mg/kg
Calcium Carbon Dioxide	200.7 SM406	80-120 NA	20.0 20.0	0.100 mg/L 0.100 mg/L
Carbonate	310.1	NA	20.0	0.100 meg/L
Carbonate	310.1	NA -67-	20.0	0.100 mg/L

CONSTITUENT	METHOD	Accuracy % Recovered	Precision RPD	MDL
Chloride	SM407C	80-120	20.0	0.100 meq/L
Chloride	SM407C	80-120	20.0	0.100 mg/L
Chloride	SM407C	70–130	30.0	0.100 mg/kg
Chlorine Residual	330.3	NA R 100	20.0	0.010 mg/L
Chromium	6010	D-120	50.0	0.030 mg/L
Chromium	6010	70-130	30.0	0.001 mg/kg
Chromium	7191	80-120 75 125	20.0 20.0	0.001 mg/L 1.000 ug/L
Chromium VI	218.2 71 <b>9</b> 6	75-125 D-120	20.0	1.000 ug/L 0.001 mg/L
Chromium VI Chromium VI	71 <b>9</b> 6	D-130	30.0	0.001 mg/kg
Chromium VI Cobalt	6010	D-130 D-120	50.0	0.030 mg/L
Cobalt	6010	70-130	30.0	0.005 mg/kg
Cobalt	200.7	80-120	20.0	5.000 ug/L
Color	110.3	NA	20.0	0.300 units
Conductivity	120.1	80-120	20.0	0.100 umhos
Copper	6010	D-120	50.0	0.030 mg/L
Copper	6010	70-130	30.0	0.300 mg/kg
Copper	7210	80-120	20.0	0.005  mg/L
Copper	7210	70-130	30.0	0.005  mg/kg
Copper	200.7	80-120	20.0	5.000 ug/L
Copper	220.1	80-120	20.0	5.000 ug/L
Corrosivity		NA	30.0	N/A
Corrosivity (pH)		NA	20.0	N/A
Cyanide, Total	335.2	75-125	20.0	0.005 mg/L
Cyanide, Total	335.2	65-135	30.0	0.005 mg/kg
Dilute Acid or Base	100 1	NA 80, 130	20.0	0.000
E. C.	120.1	80-120 70-130	20.0 30.0	0.100 umhos 0.010 mg/L
Fluoride by Dist.	340.1 340.2	80-120	20.0	0.010 mg/L 0.010 mg/L
Fluoride by electrode Gold	231.1	80-120	20.0	0.005 mg/L
Gold	231.1	70-130	30.0	0.005 mg/kg
Gypsum Requirement	Calc.	NA	N/A	N/A
Hardness, Total	130.2	80-120	20.0	0.100 mg/L
Hydroxide	310.0	NA	20.0	0.100 mg/L
Ignitability		NA	30.0	N/A
Ignitability		NA	N/A	N/A
Iron	6010	80-120	20.0	0.005  mg/L
Iron	6010	70-130	30.0	0.300  mg/kg
Iron	200.7	80-120	20.0	0.005 mg/L
Iron	200.7	80-120	20.0	5.000 ug/L
Iron	236.1	80-120 75-125	20.0	5.000 ug/L
Kjeldahl Nitrogen	351.2	75-125 65 125	20.0	0.100 mg/L
Kjeldahl Nitrogen	351.2 SM202	65-135 NA	30.0	0.100 mg/kg
Langelier Index	SM203	NA	N/A	0.100  mg/L

		Accuracy	Precision	
CONSTITUENT	METHOD	% Recovered	RPD	MDL
Lead	7420	D-120	<b>50</b> .0	0.040 mg/L
Lead	7420	70-130	<b>30.</b> 0	0.400  mg/kg
Lead	7421	75-125	20.0	0.040 mg/L
Lead	7421	65-135	<b>30.</b> 0	0.001  mg/kg
Lead	239.2	75-125	20.0	0.500 ug/L
Lithium	7430	80-120	<b>20</b> .0	0.005~mg/L
Lithium	7430	70-130	<b>30</b> .0	0.005  mg/kg
Lithium	SM303A	80-120	20.0	5.000 ug/L
MBAS	425.1	70-130	20.0	0.002  mg/L
Magnesium	6010	80-120	20.0	0.001  mg/L
Magnesium	6010	70-130	30.0	5.000 mg/kg
Magnesium	200.7	80-120	20.0	0.100 mg/L
Manganese	6010	80-120	20.0	$0.003~{ m mg/L}$
Manganese	6010	70-130	<b>30</b> .0	0.200  mg/kg
Manganese	200.7	80-120	20.0	0.005  mg/L
Manganese	200.7	80-120	<b>20</b> .0	3.000 ug/L
Manganese	243.1	80-120	20.0	3.000  ug/L
Mercury	7470	D-125	<b>50</b> .0	0.001  mg/L
Mercury	7470	65-135	30.0	0.001  mg/kg
Mercury	7471	75-125	<b>20</b> .0	0.001  mg/L
Mercury	7471	65-135	30.0	0.005  mg/kg
Mercury	245.1	75-125	20.0	0.100 ug/L
Molybden <b>um</b>	6010	D-120	<b>50.</b> 0	0.030  mg/L
Molybde <b>num</b>	6010	70-130	<b>30</b> .0	0.003  mg/kg
Molybdenum	200.7	80-120	20.0	5.000 ug/L
Nickel	6010	D-120	<b>50</b> .0	0.030  mg/L
Nickel	6010	70-130	<b>30</b> .0	0.300  mg/kg
Nickel	249.1	80-120	20.0	5.000 ug/L
Nitrate	353.2	80-120	20.0	0.100  meq/L
Nitrate	353.2	80-120	20.0	0.100  mg/L
Nitrate	353.2	70-130	30.0	0.100 mg/kg
Nitrate Nitrogen	353.2	80-120	20.0	0.020 mg.L
Nitrate Nitrogen	353.2	80-120	20.0	0.020 mg/L
Nitrate Nitrogen	353.2	70-130	30.0	0.020 mg/kg
Nitrite	353.2	80-120	20.0	0.100 mg/L
Nitrite	353.2	70-130	30.0	0.100 mg/kg
Nitrite Nitrogen	353.2	80-120	20.0	0.020 mg/L
Nitrite Nitrogen	353.2	70-130	30.0	0.020 mg/kg
Nitrogen, Organic	Calc.	NA NA	20.0	0.100 mg/L
Nitrogen, Organic	Calc.	NA 20. 120	30.0	0.100 mg/kg
Nitrogen, Total	351.2	80-120 70-130	20.0 <b>30</b> .0	0.100 mg/L
Nitrogen, Total	351.2	/U-13U NA	20.0	0.100 mg/kg
Nitrogen, Total	Calc.	NA NA	30.0	0.100 mg/L
Nitrogen, Total	Calc. 140.1	NA NA	20.0	0.100 mg/kg 0.100 TON
Odor Oil and Grease	413.1	NA NA	20.0	0.100 TON 0.100 mg/L
Oil and Grease	413.1	NA NA	<b>30</b> .0	0.100 mg/kg
Oxygen, dissolved	360.1	NA NA	20.0	0.100 mg/kg 0.050 mg/L
onfacil, dissolved	300.1	-69-	20.0	3.333 mg/L

	METHOD	Accuracy	Precision	MDL
CONSTITUENT	METHOD	% Recovered	RPD	MUL
Phenols	420.1	75-125	20.0	0.010 mg/L
Phenols	420.1	65-135	30.0	0.010  mg/kg
Phosphate	365.2	80-120	20.0	0.010 mg/L
Phosphate (Phosphorous	365.2	70-130	30.0	0.010 mg/kg
Phosphorous, Total	365.2	75-125	20.0	0.010 mg/L
Phosphorous, Total	365.4	75-125	20.0	0.010 mg/L
Phosphorous, Total	365.4	65-135	30.0	0.010  mg/kg
Potassium	6010	80-120	20.0	0.001 mg/L
Potassium	6010	70-130	30.0	5.000 mg/kg
Potassium	200.7	80-120	20.0	0.100 mg/L
Reactivity Sulfide	2000.	NA	30.0	N/A
Selenium	7740	75-125	20.0	0.001 mg/L
Selenium	7740	65-135	30.0	0.001  mg/kg
Selenium	270.2	75-125	20.0	0.500 ug/L
Silica	6010	80-120	20.0	0.100 mg/L
Silver	7760	D-120	50.0	0.030 mg/L
Silver	7760	70-130	30.0	0.300  mg/kg
Silver	7761	75-125	20.0	0.001 mg/L
Silver	7761	65-135	30.0	0.001  mg/kg
Silver	272.2	75-125	20.0	1.000 ug/L
Sodium	6010	80-120	20.0	0.001  mg/L
Sodium	6010	70-130	30.0	5.000  mg/kg
Sodium	200.7	80-120	20.0	0.100  mg/L
Solids, Settleable	160.5	NA	20.0	0.010 ml/L
Solids, Total	160.1	NA	20.0	0.400 mg/L
Solids, suspended	160.2	NA	20.0	1.000  mg/L
Solids, volatile	160.4	NA	20.0	1.000 mg/L
Sulfate	375.4	80-120	20.0	0.100 meq/L
Sulfate	375.4	80-120	20.0	0.100  mg/L
Sulfate	375.4	70-130	30.0	0.100  mg/kg
Sulfide	376.2	NA	20.0	0.005 mg/L
Sulfide	376.2	NA	30.0	0.005  mg/kg
Sulfide, Dissolved	376.2	NA	20.0	0.005 mg/L
TDS	160.1	NA	20.0	0.400 mg/L
TDS	160.1	NA	20.0	0.400 ml/L
TDS by Summation	Calc.	NA NA	20.0	0.100 mg/L
Tannin & Lignin	SM513	NA D. 105	20.0	0.000 mg/L
Thallium	7840	D-125	50.0	0.030 mg/L
Thallium	7840	65-135	30.0	0.300 mg/kg
Thallium	7841	75-125	20.0	0.002 mg/L
Thallium	7841	65-135	30.0	0.002 mg/kg
Thallium	279.2	75-125 75-125	20.0	2.000 ug/L
Tin	7871 7971	75-125 65-125	20.0	0.005 mg/L
Tin Tumbiditu	7871	65-135	30.0	0.005 mg/kg
Turbidity	180.1	NA D-120	20.0 50.0	0.020 NTU 0.030 mg/L
Vanadium Vanadium	6010 6010	D-120 70-130	30.0	0.300 mg/kg
Yanadium Yanadium	200.7	80-120	20.0	5.000 ug/L
Tanau luiii	200.7	-70 <del>-</del>	20.0	3.000 dg/L
		, 🐱		

TABLE V-2 (cont'd.)

CONSTITUENT	METHOD	Accuracy % Recovered	Precision RPD	MDL
Zinc Zinc Zinc Zinc Zinc Zinc pH pH	6010 6010 7950 7950 200.7 289.1 150.0 150.1	D-120 70-130 80-120 70-130 80-120 80-120 NA NA	50.0 30.0 20.0 30.0 20.0 20.0 20.0	0.030 mg/L 0.300 mg/kg 0.005 mg/L 0.005 mg/kg 5.000 ug/L 5.000 ug/L N/A N/A
pН	150.1	NA	20.0	N/A

BFB KEY ION ABUNDANCE CRITERIA

TABLE V-4

Mass	Ion Abundance Criteria .
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	base peak, 100% relative abundance
96	5 to 9% of mass 95
173	less than 2% of mass 174
174	greater than 50% of mass 95
175	5 to 9% of mass 174
176	greater than 95% but less than 101% of mass 174
177	5 to 9% of mass 176

TABLE V-5

DFTPP KEY IONS AND ION ABUNDANCE CRITERIA

51 30 to 60% of mass 198 68 less than 2% of mass 69 70 less than 2% of mass 69 127 40 to 60% of mass 198
70 less than 2% of mass 69 127 40 to 60% of mass 198
127 40 to 60% of mass 198
1 11 14 6 100
197 less than 1% of mass 198
198 base peak, 100% relative abundanc
199 5 to 9% of mass 198
275 10 to 30% of mass 198
365 greater than 1% of mass 198
Present but less than mass 443
greater than 40% of mass 198
443 17 to 23% of mass 442

#### VI. Internal Quality Control

#### Introduction

An internal quality control program requires a set of routine internal procedures for assuring that the data generated from a measurement system meets prescribed criteria for data quality. An effective internal QC program must be capable of measuring and controlling the quality of the data, in terms of precision, accuracy, and completeness. Data is considered to be complete only if all method specific control measures have been taken, and the data can only be reported when all acceptance criteria have been met, including corrective actions, if applicable.

This section identifies QC protocols associated with analytical procedures. Included are general quality control measures as well as specific quality control checks which provide continual control and assessment of data quality, in terms of precision, accuracy, and completeness. Table VI-1 contains general QC measure for some representative wet chemistry methods. Figure VI-1 is an example of an FGL Batch Control Chart. FGL's LIMS System is also capable of generating historic control charts. Control limits are updated quarterly bsed on actual data. Figure VI-2 is an FGL QC Inspection Report Form, and Figure VI-3 is a copy of FGL's laboratory certificate issued by California Department of Health Services.

#### Sources and Preparation of Standards

Chemicals used in the laboratory are obtained from major suppliers and are usually reagent grade or better. All reagents are labeled with date received, and date opened. Standards are also obtained from these suppliers and certification documents are kept on file. The date the standard was received is recorded on the document. Labels are attached to each standard and contain the following: Element, date prepared, prepared by, source verification and expiration date. A log book for the standards prepared from the commercial standards is also kept which is labeled indicating the source, the volume of standard used, the date prepared, the name of the analyst/preparer, and how verified. In those instances where the above procedure is not possible, the chemist notebook will contain this information.

#### EPA 500 and 600 Series and SW846 GC Methods

Analytical quality control protocols for GC analyses and described in Method 8000 of SW846, 3rd ed. and equivalent procedures in the 500 and 600 series EPA methods. They include the following:

- Initial demonstration of capability
- Calibration
- Analysis of surrogate spiked samples
- Method blank analyses
- Analysis of matrix spike/matrix spike duplicates
- Duplicate sample analyses
- Analysis of QC check samples and/or method spikes
- Retention time window checks

These procedures are described below.

#### Initial Demonstration of Capability

Before analyzing samples, the laboratory must demonstrate the ability to generate accurate and precise data. This is achieved by analyzing four aliquots of a QC check sample (QCCS) by the same procedure intended for sample analysis. The laboratory must calculate the average recovery and the standard deviation of the recovery for each analyte of interest using the four results. The mean recovery and standard deviation for each analyte must be compared with the corresponding acceptance criteria published in the EPA method. If and only if the experimental accuracy and precision data are acceptable, certification for the method is pursued through the Environmental Laboratory Accreditation Program offered by the California Department of Health Services.

<u>Calibration</u> - Calibration standards at three concentration levels are prepared by dilution of stock standards. The average calibration factor is acceptable if the RSD between the factors is within 20 percent. Daily calibration checks are acceptable if the daily calibration factor is within 30 percent of the previous three level average.

<u>Surrogate Spikes</u> - A surrogate standard is a compound not expected to occur in an environmental sample but has chemical behavior similar to that of the target analytes. Surrogate spikes are used according to specific method requirements published by the EPA. They serve as a check on the extraction process where extraction is a necessary part of the analytical procedure. When surrogate recovery is within limits it indicates that the extraction was complete. If the surrogate spike recovery in any sample is not within limits:

- Check for errors in calculations, surrogate solutions and standards. Check instrument performance.
- Recalculate the data and/or reanalyze the extract if any of the above checks reveal a problem.
- Re-extract and reanalyze the sample if none of the above are a problem, or flag the data as "estimated concentration".

Method Blank Analysis - Before processing any samples, the analyst must demonstrate through the analysis of a reagent water method blank that all glassware and reagents are free of interferences. Each time a set of samples is extracted, a method blank must be processed to check for laboratory contamination. The blank samples should be carried through all stages of the sample preparation and analysis. Lack of interference is demonstrated if all target analytes with the exception of common laboratory reagents are below their MDLs.

QC Check Sample Analyses - QC check samples may be obtained directly from EPA or prepared from suitable reference standards, but must be prepared independently of calibration standards. The QCCS usually contains the analyte(s) of interest at a concentration in the mid-calibration range. A QCCS should be analyzed if matrix spike recoveries are unacceptable to verify that the analysis is in control.

Matrix Spike/Matrix Spike Duplicate Analyses (MS/MSD) - EPA protocol recommends analysis of matrix spike and matrix spike duplicate samples for each analytical batch or matrix type at a minimum frequency of five percent. The method recovery limits and relative percent difference (RFD) acceptance criteria are shown in Section V. When matrix spike results fall outside limits published in the respective methods, a QCCS should be analyzed to demonstrate control. If spike recoveries are outside normal limits due to matrix problems, the data should be reported noting matrix interference.

EPA 600 series protocol requires analysis of one matrix spike at a ten percent minimum frequency. A single matrix spike analysis will suffice for low level water samples where matrix effects are less likely. These recovery measurements serve as useful indicators of accuracy.

<u>Duplicate Sample Analysis</u> - EPA protocol requires duplicate sample analysis at a ten percent minimum frequency. The relative percent difference (RPD) calculated from MS/MSD analyses provides an assessment of precision. This approach is useful for typically having no detectable amounts of analyte.

Retention Time Windows - The laboratory calculates retention time windows for each standard on each GC column whenever a new GC column is installed. To establish windows, make three injections of standard throughout the course of a 72 hour period. Calculate the standard deviation of the three individual retention times for each standard. For multi-response products, (i.e. PCB's) choose one major peak from the pattern. If the standard deviation for a particular standard is zero, use the standard deviation of a close eluting, similar compound to develop a valid retention time window.

The laboratory establishes <u>daily</u> retention time windows for each analyte. The absolute retention time for each daily calibration standard serves as the midpoint of the window for that day. The daily retention time window equals the midpoint + three standard deviations as determined above.

#### EPA 500 and 600 Series and SW846 GC/MS Methods

Analytical quality control protocols for GC/MS analyses are described in Method 8000 of SW846, 3rd ed. and equivalent methods in the 500 and 600 series EPA methods. They include:

- Initial demonstration of capability
- Calibration verification
- Surrogate standard spike samples
- Reagent (Method) blank analyses
- Matrix spike duplicate analyses
- Analysis of duplicate samples (EPA 600 series)
- Mass spectrometer sensitivity check
- Daily GC/MS performance tests

Initial Demonstration of Capability - Before analyzing samples the laboratory must demonstrate the ability to generate accurate and precise data. This is achieved by analyzing four aliquots of a QC check sample (QCCS) by the same procedure intended for sample analysis. The laboratory must calculate the average recovery and the standard deviation of the recovery for each analyte of interest using the four results. The mean recovery and standard deviation for each analyte must be compared with the corresponding acceptance criteria published in the EPA method. If, and only if, the experimental accuracy and precision data are acceptable, certification for the method is pursued through the Environmental Laboratory Accreditation Program offered by the California Department of Health Services.

<u>Calibration</u> - Calibration standards at five concentration levels are prepared by dilution of stock standards. The average calibration factor is acceptable if the RSD between the factors is within 20 percent. Daily calibration checks are acceptable if the daily calibration factor is within 25 percent of the previous five level average.

<u>Surrogate Spikes</u> - All samples are spiked with surrogate standards as described in the EPA method. The method recovery acceptance limits for GC/MS methods are included in Section V, Table V-1. If the surrogate spike recovery in any sample is not within limits;

- Check for errors in calculations, reagents and standards. Check instrument performance.
- Recalculate the data and/or reanalyze the sample if any of the above checks reveal a problem
- Re-extract and reanalyze the sample if none of the above reveal the problem, or flag the data as "estimated concentration"

Method Blank Analyses - A method blank should be analyzed every 12 hours to demonstrate that interferences are below critical limits. The blank samples should be carried through all stages of the sample preparation (including extraction for semi-volatiles) and analysis. Lack of interference is demonstrated if all target analytes with the exception of common laboratory contaminants are below their MDLs. For volatile analyses the common laboratory contaminants, methylene chloride, acetone, 2-butanone and toluene, must not exceed five (5) times their MDLs. For semi-volatile analyses the common laboratory contaminants, phthalate esters, must not exceed five (5) times their MDLs.

QC Check Sample Analyses - QC check samples may be obtained directly from EPA or prepared from suitable reference standards, but must be prepared independently of calibration standards. The QCCS usually contains the analyte(s) of interest at a concentration in the mid-calibration range. A QCCS should be analyzed if matrix spike recoveries are unacceptable to verify that the analysis is in control.

Matrix Spike/Matrix Spike Duplicate Analyses (MS/MSD) - EPA protocol requires analysis of matrix spike and matrix spike duplicate samples for each analytical batch or matrix type at a minimum frequency of five percent. The method recovery limits and RPD acceptance criteria are shown in Section V. When matrix spike recoveries fall outside limits published in the respective methods, a QCCS should be analyzed to demonstrate control. If spike recoveries are outside normal limits due to matrix problems, the data should be reported noting matrix interference.

EPA 600 series protocol requires analysis of one matrix spike at a five percent minimum frequency. These matrix spike mixtures contain all of the target compounds. A single matrix spike analysis will suffice for low level water samples where matrix effects are less likely. These recovery measurements serve as useful indicators of accuracy.

<u>Duplicate Sample Analysis</u> - EPA protocol recommends duplicate analysis at a five percent minimum frequency. The RPD calculated from MS/MSD analyses provides a useful assessment of precision. This approach is recommended for water samples typically having no detectable amounts of analyte.

Mass Spectrometer Sensitivity Check - If the extracted ion current profile (EICP) area for any internal standard changes by more than a factor of two (-50% - +100%), the mass spectrometer must be inspected for malfunctions and correction action taken. Samples analyzed while the system was malfunctioning must be reanalyzed; there are no exceptions.

<u>Daily GC/MS Performance Tests</u> - Each day that analyses are performed, the GC/MS system will be checked using bromofluorobenzene (BFB) or decafluorotriphenylphosphine (DFTPP). The acceptance criteria presented in Section V, Tables V-4 and V-5 must be met prior to performing any analyses. If all criteria are not met, the instrument will be retuned and the test repeated until all criteria are achieved; there are no exceptions.

#### EPA 200 Series and SW846 Metals Methods

Metals Analyses by ICPES and Atomic Absorption - The quality control protocols associates with metals analyses are described in SW846 Method 6010 (EPA Method 200.7) for ICPES and Method 7000 (EPA Methods 206.2, 270.2, 245.1, 239.1) series for atomic absorption. They include:

- Calibration verification
- Analysis of QC check samples
- Calibration blank analyses
- Reagent blank analyses
- Analysis of matrix spike/matrix spike duplicates
- Instrument check standard analyses

These procedures are described below.

<u>Calibration</u> - Calibration standards at two concentration levels in the instruments Linear Range are prepared by diluting stock standards. These standards must be analyzed with each batch prior to sample analysis; there are no exceptions.

QC Check Sample Analyses - Immediately after calibration, a quality control check sample (QCCS) containing all elements of interest is analyzed. The results are calculated prior to analyzing any other samples. The QC standard is purchased from a commercial source. The QCCS should be prepared in the same acid matrix as the calibration standards at the mid-calibration range.

After every ten samples, the QC standard is reanalyzed. The measured value must fall in the acceptable range published by the manufacturer. If not, the instrument must be recalibrated.

<u>Calibration Blank (ICPES)</u> - At a frequency of ten percent, a calibration blank is analyzed during sample analyses. As described in Method 6010, this standard is prepared by diluting 2 mL of (1+1) HNO3 and 10 mL of (1+1) HC1 to 100 mL DI H20. If response to this standard is verified to be outside three standard deviations of the mean calibration blank value, then correct the problem, recalibrate, and reanalyze the previous ten samples.

Reagent Blank - A reagent blank, containing all the reagents and in the same volumes as used in the processing of the samples and carried through the complete preparation/analysis procedure, should be analyzed at a minimum frequency of five percent, or one per sample batch. Reagent blank results should be used to correct for possible contamination resulting from varying amounts of the acids used in processing samples.

Matrix Spike/Matrix Spike Duplicate - For each analytical batch or matrix type (five percent minimum frequency), matrix spike and matrix spike duplicate samples should be analyzed. Matrix spike results should fall within the acceptable percent recovery range listed in Section V. If the spike is not recovered within the specified limits, the data should be flagged as suspect due to matrix effects. Depending on the project, provisions are established to use standard-addition analysis procedures to compensate for matrix effects.

Duplicate spiked sample results should agree within the acceptable percent RPD listed in Section V. If they do not, evaluate the system for the source of the imprecision, and correct the problem.

#### Total Organic Carbon

Determination of Total Organic Carbon is performed according to EPA 415.1 and 9060. Quality control measures include the following:

- Calibration
- QC Check Samples
- Method Blanks
- Matrix Spike/Matrix Spike Duplicates

These procedures are described below.

<u>Calibration</u> - For water samples, multiple calibrations (3) in the 0-50 ppm range are performed daily prior to sample analysis. If the calibration areas are within ten percent of one another the analysis may proceed. If not, repeat calibration. For solid samples, a one point single calibration is performed using 150 microliters of 1000 ppm carbon standard injected onto quartz wool and pyrolyzed.

OC Check Samples - QC check samples are obtained commercially (ERA and NIST) and are analyzed immediately after calibration and at the end of the analysis. The QC check sample must fall within 80 to 120 percent of the true value. If not, it must be reanalyzed. If still out of limits all samples must be reanalyzed after checking the entire system for errors. For soil samples, QC check samples are analyzed first, last, and at a minimum frequency of ten percent.

Method Blanks - Method blanks apply to water samples only, and are analyzed immediately following the first QC check sample. The result should be zero. If not, reagent blanks must be performed, the system recalibrated, and the QC check sample reanalyzed prior to re-analysis of the blank.

Matrix Spike/Matrix Spike Duplicates - Matrix spike/matrix spike duplicates are analyzed at a minimum frequency of ten percent for water samples. The acceptance limits shown in Section V must be met, otherwise the samples must be reanalyzed. Since matrix spikes are applicable to soil samples (sample size = 10 mg), all samples are analyzed in duplicate, and the precision limits listed in Section V must be met. Otherwise, the samples must be reanalyzed.

### Total Organic Halogens (TOX)

Determination of TOX is performed according to EPA 9020. Quality control measures include the following:

- Test titrations
- Calibration
- Matrix spike/matrix spike duplicates

These procedures are described below.

<u>Test Titrations</u> - Prior to sample analysis, two test titrations must be performed. The end points must be within five millivolts of one another, and the gain readings must meet the criteria published by EPA in Method 9020. If out of limits, check the system and run duplicate test titrations until the criteria are met.

<u>Calibration</u> - Direct injection of known amounts of analyte to the pyrolysis tube are performed prior to sample analysis to check cell recovery. This must be performed in duplicate and the recovery must be within 80 to 120 percent for both. If out of limits, check the system and run duplicate calibrations until the criteria are met.

Matrix Spike/Matrix Spike Duplicates - Matrix spike/matrix spike duplicates are analyzed at a minimum frequency of ten percent. Both results must be within 80 to 120 percent of the true value with a 20 percent RPD maximum. Otherwise, check the system and reanalyze duplicate matrix spikes until the criteria are met. If unable to meet acceptance limits, the analysis must be redone from the beginning unless matrix interference can be cited.

#### Gross Alpha/Beta

Gross alpha/beta analysis is performed according to EPA 900.0. Quality control measures include the following:

- Efficiency vs. solids chart
- Background
- EC measurement
- Matrix spike/matrix spike duplicates

These procedures are described below.

Note: Samples above the MCL for alpha/beta must be recounted for verification.

Efficiency vs. Solids Chart - Prior to analyzing any samples, for each instrument an efficiency vs. solids chart must be generated as part of the initial demonstration of capability. In addition, whenever an instrument is maintained or repaired (i.e. a counting wire replaced) a new efficiency vs. solids charge must be generated. Only NBS traceable standards may be used. Samples containing solids such that the efficiency of counting drops below ten percent must be reset using a smaller aliquot so that the solids give acceptable counting efficiency.

<u>Background</u> - Background samples are run daily, prior to sample analysis. However, a weekly average may be used for calculation purposes.

<u>EC Measurement</u> - Prior to setting up a sample, an electrical conductivity measurement must be made for estimation of total dissolved solids. This estimate helps to determine the sample aliquot necessary to meet the efficiency vs. solids requirement.

Matrix Spike/Matrix Spike Duplicates - Matrix spike/matrix spike duplicates should be analyzed at a minimum frequency of ten percent. The acceptance limits shown in Section V must be met, unless matrix interference can be cited. Only NBS traceable standards may be used for spiking.

### otal Radium, Natural Uranium, and Radioactive Strontium

These analytes are determined by EPA 900.1, EPA 908.0, and EPA 905.0, respectively quality control measures include the following:

- Background
- Calibration
- Matrix Spike/Matrix Spike Duplicates

These procedures are described below.

<u>Background</u> - Background samples are run daily prior to sample analysis, however a weekly average may be used for calculation purposes.

<u>Calibration</u> - One point calibration is sufficient for each batch of samples. Calibration factors are stable over time if no instrument parameters have changed. If the calibration factor differs from the running average by more than 20 percent, check the instrument and recount the standard or prepare new standard and recount. Only NBS traceable standards may be used.

Matrix Spike/Matrix Spike Duplicates - Matrix spike/matrix spike duplicates should be analyzed at a minimum frequency of ten percent. The acceptance limits listed in Section V must be met unless matrix interference can be cited. Only NBS traceable standards may be used.

#### adon-222 and Tritium

These analytes are determined by EPA 913.0 and 906.0, respectively. Quality control measures include the following:

- Background
- Calibration
- Duplicate Analyses

These procedures are described below.

<u>Background</u> - Background samples must be run daily prior to sample analysis. Background are generally stable overtime, and must be below or less than ten percent above the historical average. If our of limits, the entire system must be checked for errors and contamination. The background requirements must be met, otherwise sample analysis cannot proceed.

<u>Calibration</u> - Three point calibration is required using NBS Traceable Standards only. Calibration factors must be within twenty percent Relative Standard Deviation. The calibration requirements must be met, otherwise sample analysis cannot proceed. If out of limits, the entire system must be checked for errors and contamination.

<u>Duplicate Analyses</u> - Duplicate analyses must be performed at a minimum frequency of ten percent. The limits listed in Section V must be met for tritium if the duplicate contains detectable amounts of tritium. Radon samples are field duplicates which may not meet the limits listed in Section V, however "poor duplication" must be cited on the report if the limits are not met.

### Titrimetric Determination of Alkalinity

**EPA** 

Titrimetric determination of alkalinity is performed according to

Method 310.1. Quality control procedures include the following:

- Titrant Standardization
- Laboratory Control Sample
- Duplicate Analyses

<u>Titrant Standardization</u> - The sulfuric Acid titrant is standardized against sodium carbonate.

<u>Laboratory Control Sample Analyses</u> - Alkalinity QC check standard is analyzed daily. Recovery within EPA stated limits is required for analyses to proceed.

<u>Duplicate Analyses</u> - A duplicate analysis is analyzed every ten samples. The duplicate analysis should include all sample preparation steps. Precision should be within twenty percent RPD, or  $\pm 1/2$  detection limits.

#### olorimetric Determination of Phosphate

Sample will be analyzed for EPA Method 365.2. Quality control procedures include the following:

- Calibration coefficient
- Analysis of Laboratory Control Samples
- Analysis of matrix spike/matrix spike duplicates

<u>Calibration</u> - A calibration curve is prepared daily, with verification.

<u>Laboratory Control Sample Analyses</u> - Analyze a laboratory control sample immediately after calibration. Recovery should be within ERA stated limits for analysis to proceed.

Matrix Spike/Matrix Spike Duplicates - For every sample matrix analyzed (minimum ten percent frequency), verification is required to ensure that chemical interference is not affecting color development. The spike recovery should be between 80 to 120 percent. Samples that suffer from matrix interferences shall be diluted and reanalyzed.

#### Cyanide Analyses

Inorganic cyanide will be determined colorimetrically according to EPA Method 335.2 and SW846 Method 9010. Quality control procedures include:

- Calibration Verification
- Method Blank Analyses
- Analyses of Laboratory Control Samples
- Duplicate Analyses
- Analyses of Matrix Spiked Samples

<u>Calibration</u> - Calibration procedures are described in Section V. A calibration curve is prepared daily, with verification.

<u>Method Blank Analyses</u> - A minimum of one reagent blank per sample batch will be analyzed to determine if contamination or memory effects have occurred.

<u>Laboratory Control Sample Analyses</u> - A QC check sample, prepared independently of calibration standards, is analyzed daily. Recovery should be within ERA stated limits for analysis to proceed.

<u>Duplicate Analyses</u> - A duplicate analysis or matrix spike duplicate analysis should be run every ten samples. The duplicate run includes the whole sample preparation and analytical process. Precision should be within 20 percent RPD or  $\pm$ 0 detection limits.

<u>Matrix Spike Analyses</u> - For each batch or matrix type (up to 20 samples), an aliquot of sample should be spiked and analyzed. Recovery of the spike should be within 25 percent of the amount added.

#### Fluoride Analyses

Fluoride analyses will be performed according to EPA Method 340.2. Quality control procedures include:

- Multipoint calibration
- Analyses of QC Check Samples
- Duplicate Analyses
- Analyses of Matrix Spiked Samples

<u>Calibration</u> - Calibration procedures are described in Section V. The method specified a daily multipoint calibration with verification.

<u>Laboratory Control Sample Analyses</u> - A QC check sample, prepared independently of calibration standards, should be analyzed daily. Recovery should be within ERA stated limits for analysis to proceed.

<u>Duplicate Analyses</u> - A duplicate analysis or matrix duplicate analysis should be run every ten samples. The duplicate run should include the whole sample preparation and analytical process. Precision should be within 20 percent RPD, or +/-1 detection limit.

Matrix Spike Analyses - For each batch or matrix type (minimum of ten percent), an aliquot of sample should be spiked and analyzed. Recovery of the spike should be within 20 percent of the amount added.

#### Turbidimetric Determination of Sulfate

Turbidimetric determination of sulfate is performed according to EPA Method 375.4 or SW846 Method 9038. Quality control procedures include the following:

- Multipoint Calibration
- QC Check Sample Analyses
- Duplicate Analyses
- Matrix Spike Analyses

<u>Multipoint Calibration</u> - A multipoint calibration curve will be prepared daily, as described in Section V.

<u>Laboratory Control Sample Analyses</u> - A sulfate QC check standard is analyzed daily. Recovery should be within ERA stated limits for analyses to proceed.

<u>Duplicate Analyses</u> - A duplicate analysis (or matrix spike duplicate) is analyzed every 10 samples. The duplicate analysis should include all sample preparation steps. Precision should be within 20 percent RPD, +/-1 detection limit.

Matrix Spike Analyses - For each batch of samples of a matrix type (20 maximum), an aliquot of sample will be spiked and analyzed. Recovery of the spike should be within 20 percent of the expected value; if not, the data will be flagged.

#### aste Extraction Test

The waste extraction test will be performed according to procedures described in the California Administrative Code, Section 66700. Quality control procedures include:

- Method Blank Analyses
- Duplicate Extractions

<u>Method Blank Analyses</u> - A minimum of one reagent blank per sample batch will be analyzed to determine if contamination or memory effects have occurred.

<u>Duplicate Extractions</u> - A duplicate extraction will be performed with every batch of samples, at a minimum frequency of ten percent. Results for analyses of the duplicate extracts will be used to estimate overall measurement variability.

# SUMMARY OF CALIBRATION AND INTERNAL QUALITY CONTROL PROCEDURES FOR REPRESENTATIVE WET CHEMISTRY ANALYSES

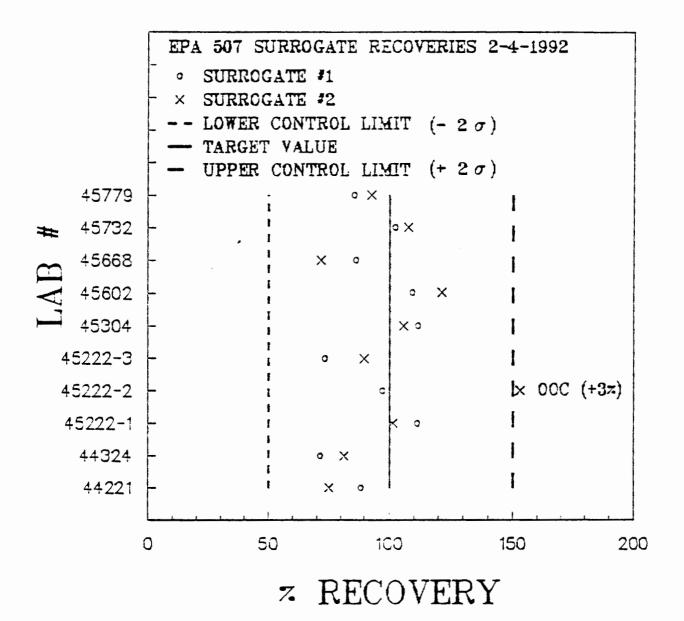
Parameter	Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
Conductane (aqueous)	120.1	Single-point calibration	Prior to sample analyses +	Measured value within -2% of true value	<ol> <li>Repeat calibration</li> <li>See instrument manual</li> </ol>
		QC Sample and after every 20 samples (minimum) two per set)	After calibration	Measured value within +10% of true value	<ol> <li>Repeat check</li> <li>Repeat calibration and check</li> </ol>
		Duplicate analysis	5%	Coefficient of variation (CV) ≤ 10%	Obtain third value
Hardness	130.2	QC check sample	One per batch	+10%	<ol> <li>Evaluate system</li> <li>Repeat calibration</li> </ol>
		Duplicate Spike	10% 10%	RPD <20%	<ol> <li>Obtain third value</li> <li>Flag data</li> </ol>
pH (aqueous)	150.1	Two-point calibration	Daily prior to sample analyses	Reading within 0.05 pH units of buffer solution values	<ol> <li>Repeat calibration</li> <li>See instrument manual</li> </ol>
		QC Sample	After calibration	Analysis within 0.2 pH units of true value	<ol> <li>Repeat check</li> <li>Repeat calibration and check</li> </ol>
		Duplicate analysis	10%	Coefficient of variation (CV) ≤1%	Obtain third value

TABLE VI-1

SUMMARY OF CALIBRATION AND INTERNAL QUALITY CONTROL PROCEDURES (continued)

Parameter	Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
TDS	160.1	QC check sample	One per batch	-10% recovery	Reanalyze samples
		Duplicate analysis	10%	RPD 20%	<ol> <li>Obtain third value</li> <li>Flag data</li> </ol>
TSS	160.2	QC check sample	One per batch	+10% recovery	Reanalyze samples
		Duplicate analysis	10%	RPD 20%	<ol> <li>Obtain third value</li> <li>Flag data</li> </ol>
Turbidity	180.1	Duplicate	10%	+ <u>&lt;</u> 20 RPD	<ol> <li>Obtain third value</li> <li>Flag data</li> </ol>
Nitrate-N Ammonia-N	353.1 350.1	QC check sample	10%	ERA Values	<ol> <li>Evaluate system</li> <li>Repeat calibration</li> </ol>
		Duplicate analysis	10%	RPD 20%	<ol> <li>Obtain third value</li> <li>Flag data</li> </ol>
		Spike	10%	<u>+</u> 20%	1. Flag data
		Blank	Daily	<0.04 mg/L	
		Calibration	Daily	Corr. Coef. <u>&gt;</u> 0.995	

## FGL CONTROL CHART



NOTE : OOC = OUT OF CONTROL

FIGURE VI-2

QUALITY CONTROL INSPECTION REPORT

Date:	
Time:	
	RECOMMENDATIONS

CORRECTIONS

LAB

QUALITY CONTROL DEFICIENCIES OBSERVED

Inspector's Signature:

Orborate Offices & Laboratory
O. Box 272 / 853 Corporation St.
anta Paula CA 93061
IEL: (805) 659-0910 or 525-3824
FAX: (805) 525-4172

Office & Laboratory 2500 Stagecoacn Road Stockton CA 95205 TEL: (209) 942-0181 FAX: (209) 942-0422 Field Office Visalia Cautomia 93277 TEL: (209) 734-9473 Mobile: (209) 738-6273

#### VII. Preventative Maintenance

### A). Maintenance and Repair of Instruments

Routine maintenance of equipment is performed by the analyst when appropriate. Instrument maintenance and calibration is performed by qualified service technicians (usually service representatives of the instrument manufacturer). Instrument repair is also performed by these technicians and a record (containing the date, the nature of the problem, description of the repair, and the name of the technician) is also kept.

### B). Good Laboratory Practices

Good laboratory practices are followed to prevent contamination of samples and standards. This includes the careful cleaning of glassware, and the use of disposable labware and containers when practical. Sample containers are monitored for contamination when received according to lot number and proposed use.

The deionized water is monitored by an automatic shut-off valve (at a set resistance of 500,000 ohms), checked monthly for pH, standard plate count, electrical conductivity, total dissolved solids, residual chlorine, and heavy metals (to include lead, cadmium, chromium, copper, nickel and zinc).

The analytical balances are certified once a year by a qualified specialist, and checked weekly using standard S weights.

All refrigerator, oven, and incubator temperatures are monitored daily, and all thermometers are checked for accuracy on a quarterly basis.

Fumehood velocities are checked monthly and sash marks are adjusted if necessary according to CAL OSHA regulations.

The pH meter is to be standardized on the day of use with two (2) buffer solutions (pH 4, 7 and/or 10).

The conductivity meter is to be standardized once a month with 0.01 N KCl solution.

The turbidity meter is to be standardized with standards before use. Standards are replaced yearly and checked with EPA check samples or equivalent commercial check samples.

The QA/QC Director must be notified immediately if any sign of malfunction occurs in any instrument so that he can decide if a qualified serviceman should be consulted.

In accordance with current regulations, hazardous materials are clearly labeled and Material Data Safety Sheets are available for employee inspection.

### C. Performance and System Audits

Quality Control Inspections will be conducted quarterly. Quality Control spot checks are conducted weekly. Quality control spot check/inspection reports are kept on file in the QA Directors office. Photocopies of these reports are distributed to lab managers immediately following the inspections/spot checks. Corrective actions are expected to be implemented within 30 days of the inspection/spot check. Semi-annually, FGL, Inc. participates in EPA Performance Evaluation Studies and/or EPA inter laboratory comparison studies. FGL also conducts annual double-blind performance studies through environmental resource associates.

### VIII. Data Reduction, Validation and Reporting

Before reporting, all data is qualified as being acceptable according to Internal Quality Control requirements (e.g. acceptance limits, holding times, preservation, etc...).

#### IX. Corrective Action in Out-of-Control Situations

The results obtained from the duplicate and the spiked samples should be within the acceptance limits. In the event of an out-of-control situation, the following (in order) should be investigated:

- 1). Check for errors in calculation
- 2). Check calibration and instrument performance. Prepare new standards if necessary.
- Reanalyze, if possible, the duplicate or spiked sample. (prepare a new spiked sample if necessary).

If there is insufficient sample for re-analysis, an alternate sample from the set may be analyzed as either a duplicate or a spiked sample.

If an instrument is not functioning properly, immediately notify the QA Director. If unavailable, then notify the lab manager. If neither are available, then post a notice on the instrument indicating "out of order" condition, and continue working with other instruments known to be functioning properly. Notify the QA Director as soon as possible.

Each work area has a corrective actions notebook. When corrective actions are necessary, an entry is made to the notebook identifying the problem, method, the analyst, and proposed corrective actions. After implementing the actions another entry is required to verify that the problem was solved. This process may need to be repeated in some situations. If matrix interference is the cause for the out of control situation the data may be reported with the appropriate explanation, and results reported as "estimated concentration".

#### X. Safety

FGL has a progressive safety program which meets all OSHA requirements, as well as those of Senate Bill #198. At all times FGL has the following materials readily available to it's employees:

- Material Safety Data Sheets
- OSHA Laboratory Standard Regulations
- FGL Emergency Action Plan
- FGL Chemical Hygiene Plan
- FGL Fire Prevention Plan
- FGL Hazard Communication Plan
- FGL Injury and Illness Prevention Plan

The above materials are available to outside parties upon request.

FGL holds monthly safety inspections and quarterly safety training sessions and safety committee meetings. At FGL, quality and safety go hand-in-hand.

#### DEPARTMENT OF HEALTH SERVICES

2151 BERKELEY WAY
BERKELEY, CA 94704-1011

(510)540-2800



May 13, 1992

Certificate No.: 1573

Mr. Darrell Nelson
"FGL Environmental
P:0.3ox 272
Santa Paula, CA 93061

Dear Mr. Nelson:

Enclosed is an updated copy of your ELAP Fields of Testing List. If you have any questions, please contact our office at (510) 540-2800.

Sincerely,

William R. Ray

Water/wastewater Laboratory Consultant

Environmental Laboratory Accreditation Program

Enclosure

# ENVIRONMENTAL LABORATORY ACCREDITATION/REGISTRATION List of Approved Fields of Testing and Analytes

	Environmental/Santa Paula Corporation Street a Paula, CA 93060	PHONE: (805) 6 COUNTY: Ventur		LABORATORY CATEGO CERTIFICATE NUMBE	
1.0	Microbiology of Orinking Water and Waste				
1.1	Total Coliforms by Multiple Tube Ferment	ationY	1.5	Heterotrophic Plate Count	
1.2	Fecal Coliforms by Multiple Tube Ferment	acionY	1.5	Total Coliforms by MMO-MUG Orinkin	ng Water Only
1.3	Tota Coliforms by Membrane Filter	N	1.7	Fecal Coliforms by MMO-MUG Orinkin	ng Water Only
1.4	Fecal Coliforms by Membrane Filter	N			
2.0	Inorganic Chemistry and Physical Propert		excluding 1	Toxic Chemical Slements	(07-15-9
2.1	Alkalinity		2.8	MBAS	
2.2	Calcium		2.9	Nitrace	
2.3	Chloride	γ	2.10	Nitrite	
2.4	Connosivity	Y	2.11	Sodium	
2.5	Fluorida		2.12	Sulfate	
2.3	Pardness		2.13	Total Filterable residue and Condu	
	*agnasium				
2.7	agnesium		2.14	Iron (Colorimetric Only)	
			2.15	Manganese (Colorimetric Only)	444
3.0	Analysis of Toxic Chemical Elements in O				`
3.1	Arsenic		3.8	Manganese	
3.2	Barium		3.9	Mercury	
3.3	Cadmium	Y	3.10	Selenium	
3.4	Chromium, total	<u>'</u>	3.11	Silver	
3.5	Copper	Y	3.12	Zinc	~
3.8	From		3.13	Aluminum	
3.7	Lead	Y		Asbestos	
1.1	Volatile Organics	N	4.3	Acid and Base/Neutral Compounds	
5.0	Organic Chemistry of Drinking Mater (exc	1			
		luaina measurements a	v GC/MS comb	ination)	(07-15-91
5.1	Total Trihalomethanes		5.8	ED8 and OBC?	
5.1 5.2	Total Trihalomethanes	Y Y	5.6 5.7	EDB and OBCP	
5.1 5.2 5.3	Total Trihalomethanes	Y Y	5.6 5.7 5.8	EDB and OBCP	
5.1 5.2 5.3 5.4	Chlorophenoxy herbicides	Y Y	5.6 5.7 5.8 5.9	EDB and OBCP	
i.1 i.2 i.3	Total Trihalomethanes	Y Y N	5.5 5.7 5.8 5.9 5.99	EDB and OBCP	
5.1 5.2 5.3 5.4 5.5	Total Trihalomethanes	YYN	5.8 5.7 5.8 5.9 5.99	EDB and OBCP	(07-15-91
5.1 5.2 5.3 5.4 5.5	Chlorinated pesticides	Y	5.5 5.7 5.8 5.9 5.99	EDB and OBCP Polychiorinated Siphenyls Polychiorinated Siphenyls Polychiorinates Pesticides Polychosate Polychosat	(07-15-91
5.1 5.2 5.3 5.4 5.5	Chlorinated pesticides	Y	5.8 5.7 5.8 5.9 5.99	EDB and OBCP Polychiorinated Siphenyls Polychiorinated Siphenyls Polychiorinated Siphenyls Polychiologen/Phosphorus Pesticides Glyphosate Polychiologen Poly	(07-15-91
5.1 5.2 5.3 5.4 5.5	Chlorinated pesticides	Y	5.5 5.7 5.8 5.9 5.99	EDB and OBCP	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium	Y	5.5 5.7 5.8 5.9 5.99	EDB and OBCP	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium	Y	5.5 5.7 5.8 5.9 5.99	EDB and OBCP  Polychiorinated Biphenyls Carbamates Nitrogen/Phosphorus Pesticides Glyphosate  Iodine 131	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4	Chlorinated pesticides	Y	5.5 5.7 5.8 5.9 5.99	EOB and OBCP  Polychiorinated Biphenyls Carbamates  Nitrogen/Phosphorus Pesticides Glyphosate  Iodine 131	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4 6.5	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radioactive Casium	Y	5.5 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10	EOR and OBCP  Polychiorinated Siphenyls	(07-15-91
5.1 5.2 5.3 5.4 5.5 5.5 5.1 6.2 6.3 6.3 6.3 7.0	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radioactive Casium  Shellfish Sanitation	Y	5.5 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10	EDB and OBCP  Polychiorinated Biphenyls Carbamates	(07-15-91
5.1 5.2 5.3 5.4 5.5 5.5 5.1 5.2 5.3 5.4 5.5 5.5	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Aromatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radioactive Casium  Shellfish Sanitation Shellfish meat Microbiology		5.6 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10 6.11	EDB and OBCP  Polychiorinated Biphenyls Carbamates	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4 6.5 6.5	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radioactive Casium  Shellfish Sanitation		5.6 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10 6.11	EDB and OBCP  Polychiorinated Biphenyls Carbamates	(07-15-91
5.1 5.2 5.3 5.4 5.5 5.0 6.1 5.2 5.3 5.4 5.5 5.5 7.0 7.1	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Aromatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radioactive Casium  Shellfish Sanitation Shellfish meat Microbiology		5.5 5.7 5.8 5.9 5.99 6.7 5.8 6.9 6.10	EOR and OBCP  Polychiorinated Biphenyls	(07-15-91
5.1 5.2 5.3 5.4 5.5 5.0 6.1 5.2 5.3 5.4 5.5 5.5 7.0 7.1	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles Radiochemistry Gross alpha and beta and counting error Total Radium Radium 225 Uranium Radon 222 Radioactive Casium Shellfish Sanitation Shellfish meat Microbiology Acuatic Toxicity Bioassays All Fresh Water: Static, Static/Renewal and		5.8 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10 7.2	EDB and OBCP  Polychiorinated Biphenyls	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4 6.5 6.5 7.1	Chlorinated pesticides Chlorophenoxy herbicides Halogenated Volatiles Arcmatic Volatiles  Radiochemistry Gross alpha and beta and counting error Total Radium Radium 226 Uranium Radon 222 Radioactive Casium  Shellfish Sanitation Shellfish meat Microbiology  Acuatic Toxicity Bioassays		5.8 5.7 5.8 5.99 5.99 6.7 5.8 6.9 6.10 6.11	EDB and OBCP  Polychiorinated Biphenyls	(07-15-91
5.1 5.2 5.3 5.4 5.5 6.0 6.1 6.2 6.3 6.4 6.5 7.1	Chlorophenoxy herbicides  Chlorophenoxy herbicides  Halogenated Volatiles  Arcmatic Volatiles  Radiochemistry  Gross alpha and beta and counting error  Total Radium  Radium 225  Uranium  Radioactive Casium  Shellfish Sanitation  Shellfish meat Microbiology  Acuatic Toxicity Bioassays  All Fresh Water: Static, Static/Renewal at Estuarine/Marine: Static, Static, Renewal		5.6 5.7 5.8 5.9 5.99 6.7 6.8 6.9 6.10 6.11	EDB and OBCP  Polychiorinated Biphenyls Carbamates  Nitrogen/Phosphorus Pesticides Glyphosate  Iodine 131	(07-15-91

Reactivity (Section 56705)		
Conganic Chemistry and Toxic Chemis	and Flamence of Hazandous Hasta	
Artimony	6010(07-:5-91)	7341(06-06-36)
2 Arsenia		7060(06-06-86)
		7130(06-06-86) 7131(06-96-86)
S Chromium, total	6010(07-15-91)	7190(05-06-86)
Cosalt	6010(05-36-86)	
3 Cosser	6010(07-15-91)	7210(06-36-36)
3 (881	6010(07-15-91)	7420(06-06-86) 7421(06-06-86)
		7470(05-06-86)
12 Nicke]	6010(07-:5-91)- <del>-</del>	7520(06-06-86)
		7740(06-06-36)
1 3' /BF	501U(07-15-91)	7760(06-36-86)
		7341(06-06-86)
		7950(06-06-86)
		795(05-06-86)7196(05-06-86)
		90:0(06-06-86)
3 Jyanide	2 2/25-05-36)	30,3(00-00-00)
	0.2.30-00-00)	
21 S. Fide		
21 Sulfide		
21 Sulfide		
2: Sulfide	Y 11.3 ToxicityY  = (measurement by GC/MS combination)	
2: Sulfide	Y 11.3 ToxicityY  = (measurement by GC/MS combination)	
2 Straction Tests of Hazardous Waste Section 66700 (WET)  Extraction Procedure Toxicity  Contains Chemistry of Hazardous Waste Volatile compounds	Y 11.3 ToxicityY  = (measurement by GC/MS combination)	
21 Stifide	= (axcluding measurements by GC/MS combination)	
21 Sulfide	The composition of the compositi	
21 Sulfide	= (measurement by GC/MS combination)  = (measurement by GC/MS combination)	
21 Sulfide	= (measurement by GC/MS combination)  = (measurement by GC/MS combination)  = (measurement by GC/MS combination)	
21 Sulfide	= (measurement by GC/MS combination)  a (excluding measurements by GC/MS combination)	
21 Sulfide		
21 Stifide	The contraction of the contracti	
21 Stifide	The composition of the compositi	
21 Sulfide	= (measurement by GC/MS combination)  = (excluding measurements by GC/MS combination)	
21 Stifide	= (measurement by GC/MS combination)  = (excluding measurements by GC/MS combination)	
2: Stifide	= (measurement by GC/MS combination)  = (measurement by GC/MS combination)  = (excluding measurements by GC/MS combination)	
Extraction Tests of Hazardous Wasta Section 86700 (WET)	The component of the co	
21 Stifide	= (measurement by GC/MS combination)  = (measurement by GC/MS combination)  = (measurement by GC/MS combination)	
21 Stifide	= (measurement by GC/MS combination)  = (measurement by GC/MS combination)  = (measurement by GC/MS combination)	
21 Sulfide	= (measurement by GC/MS combination)  (measurement by GC/MS combination)  (excluding measurements by GC/MS combination)	
21 Sulfide	= (measurement by GC/MS combination)  (measurement by GC/MS combination)  (measurement by GC/MS combination)	

15.3	Wastewater Inorganic Chemistry, Nutrients and Demand -			(07-15-91
15.1	AcidityY	16.23	рН	· 
15.3	AlkalinityY		Phenois	
15.3	AmmoniaY	18.25	Phosonata, ontho	
15.4	Biochemical Oxygen DemandY	16.25	Phosonorus, total	
18.5	8cronY	16.27	Pocassium	
18.5	9romideY	16.29	Resisue, Total	
18.7	CalciumY	16.29	Residue, Filterable (TDS)	
15.3	c300	16.30	Residue, Nonfilterable (TSS)	
18.3	Chemical Oxygen DemandY	16.31	Residue, Settleable (SS)	
15.10	ChlorideY	16.32	Residue, Volacile	
	Chlorine Residual, totalY		Silica	
15.12	CyanideY		Sodium	
	Cyanide amenable to ChlorinationN		Specific Conductance	
16 14	FluorideY	15.36	Sulfata	
18 .5	HardnessY		Sulfice (includes total and soluble)	
15 '5	Kjeldahl NitrogenY	16.38	Sulfite	,
15 .7	MagnasiumY		Surfactants (MBAS)	
16 19	NitrateY	16.40	Tannin and Lignin	
16.0	NitriteY	16.41	Turbisity	
15 20	Oil and Grease		Iron (Colorimetric Only)	
16 21	Organic CarbonY	16.42	Manganese (Colorimetric Only)	
10.01	Oxygen, DissolvedY	10.43	TRPH	
10.24			TOX	
17.3	Toxic Chemical Elements in Wastewater			
	AluminumY		Molyscenum	
17.1	AntimonyY	17.10	Nickel	
17.2	ArsenicY		Osmius	
17.3	SariumY		Pallacium	
17.1	8erylliumY		Platinum	
17.5	CadmiumY		Rhocium	
17.5	Cadmium		Ruthenium	
17.7	Chromium (VI)		Selenium	
17.3	Chromium, total		Silver	
17.3	CobaltY			
17.10	CapperY	17.26	Strontium	
	GoldY		Thallfum	
	IridiumN		Tin	
17.13	IronY	17.29	Titanium	<u>\</u>
17.14	LeadY	17.30	Vanacium	
17.15	ManganeseY	17.31	Zinc	<del></del>
17.15	MercuryY			
			,	
18.3	Organic Chemistry of Wastewater (measurements by GC/MS	combination)		07-15-91)
18.1	Volatile Organics			<del></del>
18.2	Acid and Base/Neutral compounds		*	
	0	b. 00/MCb:	÷\	AT 15 A1)
	Organic Chemistry of Wastewater (excluding measurement			
19.	Halogenated VolatilesN		Organischlorine Pesticides	
	Aromatic VolatilesY		Polychlorinated Biphenyls	
	Acrolein, Acrylonitrile, Acetonitrile		Nitroaromatics and Cyclic Ketones	
19.4		19.11	Polynuclear Aromatics	Y
19.5		19.12	Halcethers	N
19.5	Phthalate EstersN		Carbanates	
19.7	Nitrosoamines N	19.99	Chlorinated Herbicides	
This	laboratory is also certified for additional hazardous m	<b>mate</b> rial test catego:	ries under Certificate No	
			_	
This	laboratory is also certified for additional drinking wa	iter test categories	under Certificate No	

# APPENDIX F LABORATORY QA/QC ANALYTICAL REPORTS



February 3, 1993

RE: Organic Analyses

Lab # SP 300450

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4

### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Sample Type	Grab or Comp.	Sampled by	Sampled	te Extracted	Analyzed	Samp. Container & Preservatives	
	19930202 TOC SP 300450-01 SP 300450-02	201A		Lab. Blank Water Monitoring Well Monitoring Well	-	Abdun-nur/Bricker Abdun-nur/Bricker	01/27/93 01/27/93	 N/A N/A N/A		1,2,a 1,2,a	ND ND ND

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 0.5 mg/L by EPA Method 415.1

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental

_ Darrell H. Nelson, B.S. Laboratory Director

Steve Cartellano



February 3, 1993

RE: Organic Analyses

Lab # SP 300450

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Samiple Type	Grab or Comp.	Sampled by	Sampled		te Extracted		Samp. Container & Preservatives	TOX
1 2 3	19930202 TOX SP 300450-01 SP 300450-02	201A	., .,	Lab. Blank Water Monitoring Well Monitoring Well		Abdun-nur/Bricker Abdun-nur/Bricker	,,	01/27/93 01/27/93	N/A N/A N/A	02/02/93 02/02/93 02/02/93	1,2,a 1,2,a	ND ND ND

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 5 ug/L by EPA Method 9020

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental

Store Cartellan

February 4, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4
Sample Description: MW5/0/18/1A
Sampled by: Abdun-nur/Bricker
Container: Glass TFE-Lined Cap

Preservatives:

LAB No: SP 300450-1

RE: Organic Analysis Matrix: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993

Extracted: N/A

Analyzed : February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Acetone	10	ND	10 ND
Benzene	0.5	ND	0.5 ND
Bromodichloromethane	1	ND	1 ND
Bromoform	1	ND	1 ND
Bromomethane	1	ND	1 ND
Carbon Disulfide	5	ND	5 ND
Carbon Tetrachloride	0.5	ND	0.5 ND
Chlorobenzene	0.5	ND	0.5 ND
Chloroethane	1	ND	1 ND
Chloroform	0.5	ND	0.5 ND
Chloromethane	1	ND	1 ND
Dibromochloromethane	1	ND	1 ND
1,2-Dichlorobenzene	1	ND	1 ND
1,3-Dichlorobenzene	1	ND	1 ND
1,4-Dichlorobenzene	1	ND	1 ND
l,1-Dichloroethane	1	ND	1 ND
1,2-Dichloroethane	1	ND	1 ND
1,1-Dichloroethylene	1	ND	1 ND
trans-1,2-Dichloroethylene	1	ND	1 ND
1,2-Dichloropropane	1	ND	1 ND
cis-1,3-Dichloropropene	2	ND	2 ND
trans-1,3-Dichloropropene	1	ND	1 ND
Ethanol	5,000	ND	5,000 ND

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker

LAB No: SP 300450-1 Description: MW5/0/18/1A

### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 1 0.5 0.5 0.5 0.5 1.5 100 0.5	ND ND ND ND ND ND ND ND ND ND ND ND ND N	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	83	61-164 86
Toluene-d8	81-117	102	81-117 96
BFB	62-124	100	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)

ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Jeilht H. Neal Hutchison, B.S. Organic Laboratory Manager

Daniel H Nelson

Darrell H. Nelson, B.S. Laboratory Director

kdm

February 4, 1993

LAB No: SP 300450-2

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW6/0/18/1A Sampled by : Abdun-nur/Bricker Container : Glass TFE-Lined Cap

Sampled: January 27, 1993 Received: January 27, 1993

Extracted: N/A

Preservatives:

Analyzed: February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Acetone Benzene	10 0.5	ND ND	10 ND 0.5 ND
Bromodichloromethane	1	ND	1 ND
Bromoform	1	ND	1 ND
Bromomethane	1	ND	1 ND
Carbon Disulfide	5	ND	5 ND
Carbon Tetrachloride	0.5	ND	0.5 ND
Chlorobenzene	0.5	ND	0.5 NO
Chloroethane	1	ND	1 ND
Chloroform	0.5	ND	0.5 ND
Chloromethane	1	ND	1 ND
Dibromochloromethane	1	ND	1 ND
1,2-Dichlorobenzene	1	ND	1 ND
1,3-Dichlorobenzene	1	ND	1 ND
1,4-Dichlorobenzene	1	ND	1 ND
1,1-Dichloroethane	1	ND	1 ND 1 ND
1,2-Dichloroethane	1	ND ND	1 ND
<pre>1,1-Dichloroethylene trans-1,2-Dichloroethylene</pre>	1	ND	1 ND
1,2-Dichloropropane	1	ND ND	i ND
cis-1,3-Dichloropropene	2	ND	2 ND
trans-1,3-Dichloropropene	ī	ND	1 ND
Ethanol	5,000	ND	5,000 ND

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker

LAB No: SP 300450-2 Description: MW6/0/18/1A

### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 1 0.5 0.5 0.5 0.5 1 1.5 100 0.5	ND ND ND ND ND ND ND ND ND ND ND	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1 ND 1.5 ND 1.5 ND 100 ND 0.5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	84	61-164 86
Toluene-d8	81-117	97	81-117 96
BFB	62-124	96	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Daniel H Nelson

Darrell H. Nelson, B.S. Laboratory Director

kdm

February 3, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

QA/QC ID# 930202 TOC-201A

RE: Organic Analysis

Extracted: N/A

Analyzed: February 2, 1993

### **FGL Environmental Quality Assurance Report**

### TOC METHOD

				ACCURACY RECOVERED		PRECISION % DIFFERENCE	
CONSTITUENT		mg/L	MS	MSD	AR	RPD	MAV
TOC	415.1	90.0	104	103	80-120	1.0	20.0
MS = Matrix Spike		trix Spike Dupl			Matrix = Labora	tory Blank Wat	

AR = Acceptable Range

RPD = Relative Percent Difference

FGL ENVIRONMENTAL

Steve Castellano

Quality Assurance Director

Here Castellano

February 3, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930203 TOC-201A

RE: Organic Analysis

Extracted: N/A

Analyzed: February 3, 1993

### **FGL Environmental Quality Assurance Report**

### TOC METHOD

CONSTITUENT	CONC SPIKE mg/L		ACCURACY RECOVERED MSD AR	PRECISION % DIFFERENCE RPD MAV
тос	415.1 20.0	94	93 80-12	20 1.0 20.0

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate

RPD = Relative Percent Difference

Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930203 TOX-201A

RE: Organic Analysis

Extracted: N/A

Analyzed: February 3, 1993

### FGL Environmental Quality Assurance Report

### TOX METHOD

CONSTITUENT		CONC. SPIKED ug/L	ACCURAC % RECOVE MS MSD			%	PRECISION % DIFFERENCE RPD MAV	
TOX	9020	110.0	97	94	80-120		3.0	20.0

MS = Matrix Spike AR = Acceptable Range MSO = Matrix Spike Ouplicate RPD = Relative Percent Difference Matrix = Laboratory Blank Water
MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

Quality Assurance Director

tone Cartellano

February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930204 TOX-201A

RE: Organic Analysis

Extracted: N/A

Analyzed: February 4, 1993

### **FGL Environmental Quality Assurance Report**

### TOX METHOD

CONSTITUENT	SPI	DNC. KED % J/L MS	ACCURACY RECOVERE MSD	D %	PRECI DIFFE RPD	
TOX	9020 110	).0 97	105 80	)-120	7.0	

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate RPD = Relative Percent Difference

Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

QA/QC DATA*

	Compound			Polativo	1.00
Sample I.D. MW2 MW3 MW9 MW9 MW10	& EPA <u>Method</u> Nitrate 352.3  Fluoride 340.3  Sulfate 300.0  Chloride 300.0  Ortho-P 365.3	2 106 0 96 0 104	Duplicate 2 108 108 94 98 108	Relative <u>% Difference</u> 4  1  3  6	LCS <u>% Recovery</u> 102 101 96 96 106
Sample I.D.	EC EPA <u>Method</u>	<u>Duplicate 1</u>	Duplicate 2	Relative <u>% Difference</u>	LCS % Recovery
MW2 MW5 MW7 MW9 MW10	120.1	4170 4170 775 2770 635	4160 4170 775 2770 635	0.2 0.2 0 0	101 101 101 101 101
Sample I.D.	pH EPA <u>Method</u>	Duplicate 1	Duplicate 2	Relative % Difference	LCS <u>% Recovery</u>
MW1 MW5 MW7 MW8	150.1	7.7 7.8 7.4 7.1	7.7 7.9 7.4 7.1	0 1 0 0	101 101 101 101

*For Lab No.'s: 300423, 300439, 300440, 300441, 300443, 300444, 300445, 300449

Very truly yours, FGL ENVIRONMENTAL

Steve Castellano, M.S.

Quality Assurance Director

KW/DHN:mlh

Daniel H Nelson

Darrell H. Nelson, B.S. Laboratory Director

February 10, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus, CA 91350 QA/QC ID# 930201 608-202A

RE: Organic Analysis

Extracted: February 1, 1993 Analyzed: February 4, 1993

### **FGL** Environmental Quality Assurance Report

#### EPA METHOD 608

CONSTITUENT	CONC.	ACCURAC	PRECISION		
	SPIKED	% RECOVE	% DIFFERENCE		
	ug/L	MS MSD	RPD MAV		
Aldrin	0.3	128 136	31-146	6.0	30.0
Dieldrin	1.3	110 116	55-139	6.0	80.0
Endrin	1.3	118 125	54-163	6.0	30.0
Heptachlor	0.3	111 121	39-170	9.0	30.0
Lindane	0.3	103 109	37-145	7.0	30.0

MS = Matrix Spike AR = Acceptable Range MSD = Matrix Spike Duplicate RPD = Relative Percent Difference Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

February 15, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930202 615-205A

RE: Organic Analysis

Extracted: February 2, 1993
Analyzed: February 2, 1993

### **FGL Environmental Quality Assurance Report**

#### EPA METHOD 615

CONSTITUENT	CONC. SPIKED ug/L	D % RECOVERED		PRECISION % DIFFERENCE RPD MAV
2,4-D 2,4-DB 2,4,5-T 2,4,5-TP (Silvex) Bentazon Dalapon Dichloroprop Dinoseb Pentachlorophenol Picloram	1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5	80 86 63 79 75 85 99 108 132 135 123 104 88 83 84 120 118 117 103 110	30-150 30-150 30-150 30-150 30-150 30-150 30-150 30-150 30-150	7.0 30.0 22.0 30.0 12.0 30.0 9.0 30.0 3.0 30.0 16.0 30.0 6.0 30.0 35.0 * 30.0 1.0 30.0 7.0 30.0
SURROGATE 2,4-DCAA	2.0	194 * 164 *	30-150	

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

Quality Assurance Director

* Percent recovery and/or percent difference is above acceptance limit, however, all other QC criteria were met.

February 15, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930201 615-205A

RE: Organic Analysis

Extracted: February 1, 1993 Analyzed: February 1, 1993

### FGL Environmental Quality Assurance Report

### EPA METHOD 615

CONSTITUENT	CONC. SPIKED ug/L	ACCURACY % RECOVERED MS MSD AR		PRECISION % DIFFERENCE RPD MAV
2,4-D 2,4-DB 2,4,5-T 2,4,5-TP (Silvex) Bentazon Dalapon Dichloroprop Dinoseb Pentachlorophenol Picloram	1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5	79 59 76 28 62 36 89 58 116 116 113 132 90 59 67 57 113 135 90 89	30-150 30-150 30-150 30-150 30-150 30-150 30-150 30-150 30-150	28.0
SURROGATE 2,4-DCAA	2.0	202 * 96	30-150	

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Matrix = Laboratory Blank Water
MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

Quality Assurance Director

Love Castellano

* Percent recovery and/or percent difference is above acceptance limit, however, all other QC criteria were met.

February 4, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 QA/QC ID# 930203 624-202A

RE: Organic Analysis

Extracted: N/A

Analyzed: February 3, 1993

### FGL Environmental Quality Assurance Report

#### EPA METHOD 624

CONSTITUENT	CONC. SPIKED ug/L	ACCURACY % RECOVERE MS MSD	PRECISION D % DIFFERENCE AR RPD MAV
Benzene Chlorobenzene	10.0		-150 23.0* 19.0 -146 23.0* 17.0
1,1-Dichloroethylene	10.0	84 93 28	3-160 10.0 54.0
Toluene Trichloroethylene	10.0 10.0		23.0* 20.0 -140 24.0* 20.0

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

^{*}Percent difference is above acceptance range; however, all other QC criteria were met.

February 9, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus, CA 91350 QA/QC ID# 930203 625-201A

RE: Organic Analysis

Extracted: February 3, 1993 Analyzed: February 3, 1993

### **FGL Environmental Quality Assurance Report**

### EPA METHOD 625

CONSTITUENT	CONC. SPIKED ug/L	%	CCURA RECOV MSD		PREC % DIFF RPD	ISION ERENCE MAV
Acenaphthene 1,4-Dichlorobenzene 2,4-Dinitrotoluene N-Nitrosodi-N-propylamine Pyrene 1,2,4-Trichlorobenzene 2-Chlorophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol	100.0 100.0 100.0 100.0 100.0 133.0 133.0 133.0	73 61 62 24 95 61 63 4 66 69 29	78 66 67 25 100 67 70 6 71 78 33	29-111 15-101 38-102 D-107 44-114 18-109 51- 96 D- 59 26-146 21- 90 D-106	7.0 8.0 8.0 4.0 5.0 9.0 11.0 50.0 7.0 12.0 13.0	30.0 30.0 50.0 30.0 30.0 50.0 50.0 50.0
SURROGATES 2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol	133.0 133.0 133.0 133.0 133.0	48 68 92 74 28 75	55 72 93 77 32 77	34-99 37-94 57-94 12-82 23-62 49-102		

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate RPD = Relative Percent Difference Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

February 9, 1993

Bermite Division of Whittaker 22116 West Soledad Canyon Road Saugus, California 91350 QA/QC ID# 930201 625-201A

RE: Organic Analysis

Extracted: February 1, 1993 Analyzed: February 3, 1993

### **FGL Environmental Quality Assurance Report**

### EPA METHOD 625

CONSTITUENT	CONC. SPIKED ug/L	ACCURACY % RECOVERED MS MSD AR	PRECISION % DIFFERENCE RPD MAV
Acenaphthene 1,4-Dichlorobenzene 2,4-Dinitrotoluene N-Nitrosodi-N-propylamine Pyrene 1,2,4-Trichlorobenzene 2-Chlorophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol	100.0 100.0 100.0 100.0 100.0 133.0 133.0 133.0 133.0	90 84 29-111 77 61 15-101 128* 124* 38-102 18 24 D-107 88 90 44-114 70 63 18-109 77 69 51- 96 D D D- 59 79 82 26-146 64 62 21- 90 58 63 D-106	7.0 30.0 5.0 30.0 3.0 30.0 29.0 50.0 2.0 30.0 11.0 30.0 11.0 30.0 N/A 50.0 4.0 50.0 3.0 50.0 8.0 50.0
SURROGATES 2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol	133.0 133.0 133.0 133.0 133.0	84 74 34-99 67 68 37-94 65 72 57-94 61 67 12-82 73* 65* 23-62 85 77 49-102	

MS = Matrix Spike AR = Acceptable Range MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

^{*}Percent recovery is above acceptance range; however, all other QC criteria were met.

February 10, 1993

Bermite Division of Whittaker 22116 West Soledad Canyon Road Saugus, California 91350 QA/QC ID# 930208

RE: Radioactivity Analyses

Date Setup: February 2, 1993 Analyzed: February 8, 1993

### **FGL Environmental Quality Assurance Report**

#### RADIOACTIVITY

CONSTITUENT	CONC.	ACCURACY	PRECISION
	SPIKED	% RECOVERED	% DIFFERENCE
	pCi/L	MS MSD AR	RPD MAV
Gross Alpha	115	77 96 75-125	22* 20.0
Gross Beta	435	121 119 75-125	2 20.0

MS = Matrix Spike
AR = Acceptable Range

MSD = Matrix Spike Duplicate RPD = Relative Percent Difference Matrix = Laboratory Blank Water MAV = Maximum Acceptable Value

FGL ENVIRONMENTAL

Steve Castellano

Quality Assurance Director

^{*}Percent difference is above acceptance range; however, all other QC criteria were met.

# APPENDIX G LABORATORY SAMPLE ANALYTICAL REPORTS

February 10, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/A/7/1 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300439-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	4150
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

The talle

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

Office & Laboratory 2500 Stagecoach Road

February 10, 1993

LAB No: SP 300439-2

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus, CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/A/ 7/2 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 OA/OC ID# : 930205 300439-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	4170
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

February 10, 1993

LAB No: SP 300439-3

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

.RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/A/ 7/3 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300439-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1	4170
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Mutalin

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

Daniell H Melon

February 10, 1993

LAB No: SP 300439-4

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/A/ 7/4 Sampled by: Abdun-nur/Bricker

Type of Sample: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993

QA/QC ID# : 930205 300439-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1	4190
pH	150.1	units		6.8

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.

ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram

Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Lutulcianso

KW/DHN:mlh

FGL ENVIRONMENTAL

Carrell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

February 3, 1993

RE: Organic Analyses

Lab # SP 300439

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Sample Type	Grab or Comp.	Sampled by	Sampled		ite Extracted	Analyzed	Samp. Container & Preservatives	TOC
1 2 3 4 5	19930203 TOC SP 300439-01 SP 300439-02 SP 300439-03 SP 300439-04	201A 201A 201A	MW2/B/ 7/2 MW2/B/ 7/3	Lab. Blank Water Monitoring Well Monitoring Well Monitoring Well Monitoring Well	Grab Grab	Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker	01/27/93 01/27/93 01/27/93 01/27/93	01/27/93	N/A N/A N/A N/A N/A	02/03/93 02/03/93 02/03/93 02/03/93 02/03/93	1,2,a 1,2,a 1,2,a 1,2,a	ND ND ND ND ND

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 0.5 mg/L by EPA Method 415.1

If you have any questions Please call.

Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental

Darrell H. Nelson, B.S.

are Castellano



February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Organic Analyses

Lab # SP 300439

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Sample Type	Grab or Comp.	Sampled by	Sampled		te Extracted	Analyzed	Samp. Container & Preservatives	
1 2 3 4 5	19930204 TOX SP 300439-01 SP 300439-02 SP 300439-03 SP 300439-04	201A 201A 201A	MW2/C/ 7/2 MW2/C/ 7/3	Lab. Blank Water Monitoring Well Monitoring Well Monitoring Well Monitoring Well	Grab Grab	Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker	,	01/27/93	N/A N/A N/A N/A	02/04/93	1,2,a 1,2,a 1,2,a 1,2,a	ND 96 100 93 110

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 5 ug/L by EPA Method 9020

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

-Environmental arrell H Nelson

Darrell H. Nelson, B.S.

February 10, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus, CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW2/H/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300449-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Chloride Nitrate Sodium Sulfate Iron Manganese	300.0 300.0 200.7 300.0 6010	mg/L mg/L mg/L mg/L mg/L mg/L	1 0.5 1 1 0.05 0.03	1240 2.2 90 9 0.06 ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kutulila Kurt Wilkinson, B.S. Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

arrell H Nelson

February 10, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW2/I/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	_
Phosphorous, Ortho	365.2	mg/L	0.1	ND	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melon

February 10, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW2/N/7 Sampled by: Abdun-nur/Bricker

Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Fluoride	340.2	mg/L	0.1	0.1	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

Corporate Offices & Laboratory Office P.O. Box 272 / 853 Corporation Street 2500

February 11, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW2/K,M/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 8, 1993 QA/QC ID# : 930208 300423-201M

#### Analytical Results - Dissolved

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Antimony	7041	ug/L	100	ND
Arsenic	7060	ug/L	50	ND
Barium	6010	ug/L	100	610
Cadmium	7131	ug/L	10	ND
Chromium	7191	ug/L	50	ND
Copper	6010	ug/L	100	ND
Lead	7421	ug/L	50	ND
Mercury	7470	ug/L	1	ND
Selenium	7740	ug/L	10	ND
Silver	7761	ug/L	10	ND
Thallium	7841	ug/L	1000	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

Darrell H Nelson

#### Page 2 of 2

#### Results of Analysis for FGL Environmental

Client Reference: SP300437 Clayton Project No. 93012.62

Sample Matrix/Media: WATER

Date Received: 01/29/93

Preparation Method: EPA 8315(Draft)

Date Prepared:

02/02/93

Analysis Method:

EPA 8315 (Draft)

Date Analyzed: 02/03/93

Lab Number	Ide	Sample entification	Date Sampled	Formaldehyde (ug/L)	Detection Limit (ug/L)
01A	1	MW1	01/27/93	<20	20
02A	2	MW2	01/27/93	<20	20
<b>03A</b>	3	MW3	01/27/93	<20	20
<b>J4A</b>	4 .	MW5	01/27/93	<20	20
05A	5	MW6	01/27/93	<20	20
<b>36A</b>	6	MW7	01/27/93	<20	20
<b>07A</b>	7	MW8	01/27/93	<20	20
08A	8	MW9	01/27/93	<20	20
09A	9	MW10	01/27/93	<20	20
10A	MET	THOD BLANK	'	15 ^a	20

Not detected at or above limit of detection QK.

Not detected at or above limit of detection <

Information not available or not applicable

¹ Actual blank value; sample results have been blank corrected.

February 10, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4
Sample Description: MW2/D/7
Sampled by: Abdun-nur/Bricker
Container: Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300439-1

RE: Organic Analysis
Matrix: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 1, 1993 Analyzed: February 4, 1993 QA/QC ID#: 930201 608-202A

EPA METHOD 608

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Endrin	2.0	ND	0.2 ND
Lindane	2.0	ND	0.2 ND
Methoxychlor	50	ND	5 ND
Toxaphene	50	ND	5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
Hexachlorobenzene	67- 94	85	26-116 85
Dibutylchlorendate	89-146	103	44-125 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

The normal method detection limit has been increased to reflect the fact that a dilution of 10.0x was required to achieve an acceptable chromatogram.

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager Darrell H. Nelson, B.S. Laboratory Director

Darrell H Nelson

mlh

February 15, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/D/7

Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300439-1

RE: Organic Analysis Matrix: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 2, 1993 Analyzed: February 5, 1993

QA/QC ID# : 930202 615-205A

#### EPA METHOD 615

CONSTITUENT	SAMPLE DLR mg/L	SAMPLE RESULTS mg/L	LAB BLANK DLR RESULTS mg/L mg/L
2,4-D 2,4,5-TP (Silvex)	0.1 0.01	ND ND	0.1 ND 0.01 ND
SURROGATE	SAMPLE AR	SAMPLE % REC.	AR % REC.
2,4-DCAA	30-150	180%	30-150 116%

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
mg/L = Milligrams Per Liter (ppm)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Jarrell H Malon

Darrell H. Nelson, B.S. Laboratory Director

kdm

February 10, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

.

Sampling Site: Bermite 85-01.4 Sample Description: MW2/E/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 8, 1993 QA/QC ID# : 930208 300439-201A

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	MCL
Gross Alpha	900.0	pCi/L		5 ± 4	5-35
Gross Beta	900.0	pCi/L		6 ± 14	50
Total Radium	900.1	pCi/L		0.7 ± 1	5

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

Daniele H Melan

February 4, 1993

LAB No: 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampled by

: Abdun-nur/Bricker

Date Started : January 27, 1993

Date Finished: January 29, 1993

Date Sampled : January 27, 1993

Date Received: January 27, 1993

TEST RESULTS

RE: BACTERIOLOGICAL ANALYSIS

Sample ID

Sample Type

Time Time Sampled Start

Coliform MPN/100 ml Feca1

MPN/100 ml

MW2/F/7

Source

12:24P 03:14P

< 1.1 ABSENT

The State Board of Public Health requires that bacteriological results must be "ABSENT" to meet drinking water requirements. Analyses were performed using Standard Methods 17th edition, APHA.

FGL ENVIRONMENTAL

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Racuel R. Haryey

February 4, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus, CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW2/0/7

Sampled by : Abdun-nur/Bricker

Container : Glass TFE-Lined Cap

Preservatives:

Sampled: January 27, 1993 Received: January 27, 1993

Extracted: N/A

Analyzed : February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

		•	`
CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Acetone Benzene	10 0.5	ND ND	10 ND 0.5 ND
Bromodichloromethane	1	ND ND	1 ND
Bromoform	i	ND	i ND
Bromomethane	i	ND	1 ND
Carbon Disulfide	5	ND	5 ND
Carbon Tetrachloride	0.5	ND	0.5 ND
Chlorobenzene	0.5	ND	0.5 ND
Chloroethane	1	ND	1 ND
Chloroform	0.5	ND	0.5 ND
Chloromethane	1	ND	1 ND
Dibromochloromethane	1	ND	1 ND
1,2-Dichlorobenzene	1	ND	1 ND
1,3-Dichlorobenzene	1	ND	1 ND
1,4-Dichlorobenzene	1	ND	1 ND
1,1-Dichloroethane	1	ND	1 ND
1,2-Dichloroethane	1	ND	1 ND
1,1-Dichloroethylene	1	ND	1 ND
trans-1,2-Dichloroethylene	1	ND	1 ND
1,2-Dichloropropane	1	ND	1 ND
cis-1,3-Dichloropropene	2	ND ND	2 ND
trans-1,3-Dichloropropene Ethanol	E 000	ND ND	1 ND 5.000 ND
L CHANOI	5,000	ND	5,000 ND

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker

LAB No: SP 300439-1 Description: MW2/0/7

#### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 1 0.5 0.5 0.5 0.5 1 1.5 100 0.5	ND ND ND ND ND ND ND ND ND ND ND	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	90	61-164 86
Toluene-d8	81-117	102	81-117 96
BFB	62-124	104	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager Darrell H. Nelson, B.S. Laboratory Director

anell H Nelson

kdm

February 9, 1993

LAB No: SP 300439-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus , CA 91350

Sampling Site: Bermite 85-01.4
Sample Description: MW2/G,P/7
Sampled by: Abdun-nur/Bricker
Container: Amber Glass TFE-Cap

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 1, 1993 Analyzed: February 5, 1993

Preservatives:

QA/QC ID# : 930201 625-201A

#### EPA METHOD 625

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAE DLR ug/L	BLANK RESULTS ug/L
Acenaphthene	10	ND	10	ND
Acenaphthylene	10	ND	10	ND
Aniline	50	ND	50	ND
Anthracene	10	ND	10	ND
Azobenzene	50	ND	50	ND
Benzidine	50	ND	50	ND
Benzo(a)anthracene	10	ND	-10	ND
Benzo(a)pyrene	10	ND	10	ND
Benzo(b)fluoranthene	10	ND	10	ND
Benzo(k)fluoranthene	10	ND	10	ND
Benzo(g,h,i)perylene	10	ND	10	ND
Benzylalcohol	20	ND	20	ND
bis(2-Chloroethoxy)methane	10	ND	10	ND
bis(2-Chloroethyl)ether	10	ND	10	ND
bis(2-Chloroisopropyl)ether	10	ND	10	ND
bis(2-Ethylhexyl)phthalate	10	ND	10	ND
4-Bromophenylphenylether	10	ND	10	ND
Butylbenzylphthalate	10	ND	10	ND
Chloroaniline	10	ND	10	ND
Chloronaphthalene	10	ND	10	ND
Chlorophenylphenylether	10	ND	10	ND
Chrysene	10	ND	10	ND
Dibenzo(a,h)anthracene	10	ND	10	ND

Table cont'd next page ...

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300439-1 Description: MW2/G,P/7

EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAE DLR ug/L	BLANK RESULTS ug/L
Dibenzofuran	10	ND	10	ND
1,2-Dichlorobenzene	10	ND	10	ND
1,3-Dichlorobenzene	10	ND	10	ND
1,4-Dichlorobenzene	10	ND	10	ND
3,3'-Dichlorobenzidine	20	ND	20	ND
Diethylphthalate	10	ND	10	· ND
Dimethylphthalate	10	ND	10	ND
Di-n-butylphthalate	10	ND	10	ND
2,4-Dinitrotoluene	10	ND	10	ND
2,6-Dinitrotoluene	10	ND	10	ND
Di-n-octylphthalate	10	ND	10	ND
Fluoranthene	10	ND	10	ND
Fluorene	10	ND	10	ND
Hexachlorobenzene	10	ND	10	ND
Hexachlorobutadiene	10	ND	10	ND
Hexachlorocyclopentadiene	10	ND	10	ND
Hexachloroethane	10	ND	10	ND
Indeno(1,2,3-c,d)pyrene	10	ND	10	ND
Isophorone	10	ND	10	ND
2-Methylnaphthalene	10	ND	10	ND
Naphthalene	10	ND	10	ND
Nitrobenzene	10	ND	10	ND
N-Nitrosodimethylamine	10	ND	10	ND
N-Nitrosodi-N-propylamine	10	ND	10	ND
N-Nitrosodiphenylamine	10	ND	10	ND
2-Nitroanaline	50	ND	50	ND
3-Nitroanaline	50	ND	50	ND
4-Nitroanaline	50	ND	50	ND
Phenanthrene	10	ND	10	ND
Pyrene	10	ND	10	ND
1,2,4-Trichlorobenzene	10	ND	10	ND
Benzoic Acid	50	ND	50	ND
2-Chlorophenol	10	ND	10	ND
2,4-Dichlorophenol	10	ND	10	ND

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300439-1 Description: MW2/G,P/7

#### EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	10 50 50 10 10 10 20 50 10 10	ND ND ND ND ND ND ND ND ND	10 ND 50 ND 50 ND 10 ND 10 ND 10 ND 20 ND 50 ND 10 ND 10 ND 10 ND 10 ND 10 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol	34- 99	58	34-99 61
	37- 94	64	37-94 74
	57- 94	45	57-94 72
	12- 82	19	12-82 71
	23- 62	28	23-62 68*
	49-102	67	49-102 75

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

Darrell H. Nelson, B.S. Laboratory Director

Darrell H Nalson

mlh

February 11, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus, CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4
Sample Description: MW7/A/7/1

/7/1 Sampled : January 27, 1993 icker Received : January 27, 1993

Completed: February 5, 1993

Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

QA/QC ID# : 930205 300443-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	767
pH	150.1	units		7.4

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melson

February 10, 1993

LAB No: SP 300443-2

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW7/A/ 7/2 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993

QA/QC ID# : 930205 300443-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	767
pH	150.1	units		7.4

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Murtellelans

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

February 10, 1993

LAB No: SP 300443-3

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/A/ 7/3 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

: January 27, 1993 Sampled Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300443-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	771
pH	150.1	units		7.4

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

tutullas

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

anell H Melon

February 10, 1993

LAB No: SP 300443-4

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW7/A/ 7/4 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300443-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Conductivity pH	120.1 150.1	umhos/cm2 units	1_	775 7.4	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Carrell H Melon

Darrell H. Nelson, B.S. Laboratory Director



February 3, 1993

RE: Organic Analyses

Lab # SP 300443

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

	Sample	Batch	Sample	Sample	Grab or	Sampled		Da	te		Samp. Container	
ID	Number	ID	Description	Туре	Comp.	by	Sampled	Received	Extracted	Analyzed	& Preservatives	TOC
1			QA/QC Blank	Lab. Blank Water					N/A	02/02/93		ND
2	SP 300443-01			Monitoring Well	1	Abdun-nur/Bricker	01/27/93		N/A	02/02/93	1,2,a	ND
3	SP 300443-02			Monitoring Well	1	Abdun-nur/Bricker	01/27/93		N/A	02/02/93	1,2,a	ND
4	SP 300443-03			Monitoring Well	1	Abdun-nur/Bricker			N/A	02/02/93	1,2,a	ND
5	SP 300443-04	201A	MM//R/ //4	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/02/93	1,2,a	ND

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 0.5 mg/L by EPA Method 415.1

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental

Darrell H. Nelson, B.S. Laboratory Director

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February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Organic Analyses Lab # SP 300443

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

		Batch		1 _ '	Grab or	Sampled			te		Samp. Container	
ID	Number	ID	Description	Туре	Comp.	by .	Sampled	Received	Extracted	Analyzed	& Preservatives	TOX
1	19930204 TOX	201A	QA/QC Blank	Lab. Blank Water					N/A	02/04/93		ND
2	SP 300443-01			Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	10
3	SP 300443-02	201A	MW7/C/ 7/2	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	9
4	SP 300443-03	201A	MW7/C/ 7/3	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	17
5	SP 300443-04	201A	MW7/C/ 7/4	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	18

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 5 ug/L by EPA Method 9020

If you have any questions Please call.

H. Neal Hutchison, B.S. Organic Laboratory Manager Darrell H. Nelson, B.S.

February 10, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/H/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300449-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Chloride	300.0	mg/L	l	148
Nitrate	300.0	mg/L	0.5	3.2
Sodium	200.7	mg/L	1	42
Sulfate	300.0	mg/L	1	9
Iron	6010	mg/L	0.05	ND
Manganese	6010	mg/L	0.03	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

Daniel H Nelson

February 10, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/I/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300445-201I

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Phosphorous, Ortho	365.2	mg/L	0.1	ND	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

arrell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

February 10, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW7/N/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993
Received : January 27, 1993
Completed : February 5, 1993
QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Fluoride	340.2	mg/L	0.1	0.2	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

arrell H Nelson

Darrell H. Nelson, B.S Laboratory Director

February 11, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker

RE: Inorganic Analysis

22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/K,M/7

Sampled by : Abdun-nur/Bricker
Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 8, 1993 QA/QC ID# : 930208 300423-201M

#### Analytical Results - Dissolved

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Antimony	7041	ug/L	100	ND
Arsenic	7060	ug/L	50	ND
Barium	6010	ug/L	100	100
Cadmium	7131	ug/L	10	ND
Chromium	7191	ug/L	50	ND
Copper	6010	ug/L	100	ND
Lead	7421	ug/L	50	ND
Mercury	7470	ug/L	1	ND
Selenium	7740	ug/L	10	ND
Silver	7761	ug/L	10	ND
Thallium	7841	ug/L	1000	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

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Darrell H. Nelson, B.S. Laboratory Director

Page 2 of 2

#### Results of Analysis for FGL Environmental

Client Reference: SP300437 Clayton Project No. 93012.62

Sample Matrix/Media: WATER

Date Received: 01/29/93

Preparation Method: EPA 8315 (Draft) Analysis Method:

EPA 8315 (Draft)

Date Prepared: 02/02/93 Date Analyzed: 02/03/93

Lab Number	Ide	Sample entification	Date Sampled	Formaldehyde (ug/L)	Detection Limit (ug/L)
01A	1	MW1	01/27/93	<20	20
02A	2	MW2	01/27/93	<20	20
<b>3</b> 3A	3	MW3	01/27/93	<20	20
<b>J4A</b>	4	MW5	01/27/93	<20	20
05A	5	MW6	01/27/93	<20	20
<b>36A</b>	6	MW7	01/27/93	<20	20
)7A	7	MW8	01/27/93	<20	20
08A	8	MW9	01/27/93	<20	20
09A	9	MW10	01/27/93	<20	20
10A		THOD BLANK		15 ^a	20

Not detected at or above limit of detection QK.

Not detected at or above limit of detection

Information not available or not applicable

¹ Actual blank value; sample results have been blank corrected.

February 11, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/D/7 Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300443-1

RE: Organic Analysis Matrix: Monitoring Well

: January 27, 1993 Sampled Received: January 27, 1993 Extracted: February 1, 1993 Analyzed: February 4, 1993 QA/QC ID# : 930201 608-202A

EPA METHOD 608

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Endrin	0.2	ND	0.2 ND
Lindane	0.2	ND	0.2 ND
Methoxychlor	5	ND	5 ND
Toxaphene	5	ND	5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
Hexachlorobenzene	67- 94	84	26-116 85
Dibutylchlorendate	89-146	101	44-125 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range

If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

Darrell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

mlh

February 15, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus, CA 91350

Matrix: Monitoring

Sampling Site: Bermite 85-01.4
Sample Description: MW7/D/7
Sampled by: Abdun-nur/Bricker
Container: Amber Glass TFE-Cap

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 2, 1993 Analyzed: February 5, 1993

Preservatives:

QA/QC ID#: 930202 615-205A

### EPA METHOD 615

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	mg/L	mg/L	mg/L mg/L
2,4-D	0.1	ND	0.1 ND
2,4,5-TP (Silvex)	0.01	ND	0.01 ND
SURROGATE	SAMPLE AR	SAMPLE % REC.	AR % REC.
2,4-DCAA	30-150	150%	30-150 116%

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
mg/L = Milligrams Per Liter (ppm)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Daniell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

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February 10, 1993

LAB No: SP 300443-1

Bermite Division of Whittaker

RE: Inorganic Analysis

22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW7/E/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

: January 27, 1993 Sampled Received: January 27, 1993 Completed: February 8, 1993 QA/QC ID# : 930208 300443-201A

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	MCL
Gross Alpha	900.0	pCi/L		2 ± 1	5-35
Gross Beta	900.0	pCi/L		2 ± 2	50
Total Radium	900.1	pCi/L		0.6 ± 1	5

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

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Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

arrell H Nelson

February 4, 1993

LAB No: 300443-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampled by : Abdun-nur/Bricker

Date Started : January 27, 1993

Date Finished: January 29, 1993

Date Sampled: January 27, 1993

Date Received: January 27, 1993

TEST RESULTS

RE: BACTERIOLOGICAL ANALYSIS

Sample ID

Sample Type

Time Sampled

Time Coliform Start MPN/100 ml Feca1

MPN/100 ml

10:59A 03:18P < 1.1 ABSENT

MW7/F/7

Source

The State Board of Public Health requires that bacteriological results must be "ABSENT" to meet drinking water requirements. Analyses were performed using Standard Methods 17th edition, APHA.

FGL ENVIRONMENTAL

rrh

February 4, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus, CA 91350

LAB No: SP 300443-1

RE: Organic Analysis

Matrix: Monitoring Well

Sampling Site: Bermite 85-01.4
Sample Description: MW7/0/7
Sampled by : Abdun-nur/Bricker

Container : Glass TFE-Lined Cap

Preservatives:

Sampled: January 27, 1993 Received: January 27, 1993

Extracted: N/A

Analyzed : February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
10	ND	10 ND
0.5	ND	0.5 ND
1	ND	1 ND
1	ND	1 ND
1	ND	1 ND
5	ND	5 ND
0.5	ND	0.5 ND
0.5	ND	0.5 ND
1	ND	1 ND
0.5	ND	0.5 ND ·
1	ND	1 ND
2	ND	2 ND
1	ND	1 ND
<b>5,0</b> 00	ND	5,000 ND
	DLR ug/L 10 0.5 1 1 0.5 0.5 1 0.5 1 1 1 1 1 1 1 2	DLR ug/L ug/L  10 ND 0.5 ND 1 ND 1 ND 1 ND 5 ND 0.5 ND 0.5 ND 0.5 ND 1

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker LAB No: SP 300443-1 Description: MW7/0/7

### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 1 0.5 0.5 0.5 0.5 1 1.5	ND ND ND ND ND ND ND ND ND ND ND	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1 ND 1.5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	86	61-164 86
Toluene-d8	81-117	101	81-117 96
BFB	62-124	103	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)

ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

Darrell H. Nelson, B.S. Laboratory Director

Darrell H Melon

kdm

February 9, 1993

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4

Sample Description: MW7/G,P/7
Sampled by : Abdun-nur/Bricker

Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300443-1

RE: Organic Analysis

Matrix: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 3, 1993 Analyzed: February 4, 1993

QA/QC ID# : 930203 625-201A

#### EPA METHOD 625

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L		LAB DLR ug/L	BLANK RESULTS ug/L
Acenaphthene	10	ND		10	ND
Acenaphthylene	10	ND		10	ND
Aniline	50	ND		50	ND
Anthracene	10	ND		10	ND
Azobenzene	50	ND		50	ND
Benzidine	50	ND		50	ND
Benzo(a)anthracene	10	ND		10	ND
Benzo(a)pyrene	10	ND	٠.	10	ND
Benzo(b)fluoranthene	10	ND		10	П
Benzo(k)fluoranthene	10	ND		10	ND
Benzo(g,h,i)perylene	10	ND		10	ND
Benzylalcohol	20	ND		20	ND
bis(2-Chloroethoxy)methane	10	ND		10	ND
bis(2-Chloroethyl)ether	10	ND		10	ND
bis(2-Chloroisopropyl)ether	10	ND		10	ND
bis(2-Ethylhexyl)phthalate	10	ND		10	ND
4-Bromophenylphenylether	10	ND		10	ND
Butylbenzylphthalate	10	ND		10	ND
Chloroaniline	10	ND		10	ND
Chloronaphthalene	10	ND		10	ND
Chlorophenylphenylether	10	ND		10	ND
Chrysene	10	ND		10	ND
Dibenzo(a,h)anthracene	10	ND		10	ND

Table cont'd next page ...

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300443-1 Description: MW7/G,P/7

## EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Dibenzofuran	10	ND	10	ND
1,2-Dichlorobenzene	10	ND	10	ND
1,3-Dichlorobenzene	10	ND	10	ND
1,4-Dichlorobenzene	10	ND	10	ND
3,3'-Dichlorobenzidine	20	ND	20	ND
Diethylphthalate	10	ND	10	ND
Dimethylphthalate	10	ND	10	.ND
Di-n-butylphthalate	10	ND	10	ND
2,4-Dinitrotoluene	10	ND	10	ND
2,6-Dinitrotoluene	10	ND	10	ND
Di-n-octylphthalate	10	ND	10	ND
Fluoranthene	10	ND	10	ND
Fluorene	10	ND	10	ND
Hexachlorobenzene	10	GИ	10	ND
Hexachlorobutadiene	10	ND	10	ND
Hexachlorocyclopentadiene	10	ND	10	ND
Hexachloroethane	10	ND	10	ND
<pre>Indeno(1,2,3-c,d)pyrene</pre>	10	ND	10	ND
Isophorone	10	ND	10	ND
2-Methylnaphthalene	10	ND	10	ND
Naphthalene	10	ND	10	ND
Nitrobenzene	10	ND	10	ND
N-Nitrosodimethylamine	10	ND	10	ND
N-Nitrosodi-N-propylamine	10	ND	10	ND
N-Nitrosodiphenylamine	10	ND	10	ND
2-Nitroanaline	50	ND	50	ND
3-Nitroanaline	50	ND	50	ND
4-Nitroanaline	50	ND	50	ND
Phenanthrene	10	ND	10	ND
Pyrene	10	ND	10	ND
1,2,4-Trichlorobenzene	10	ND	10	ND
Benzoic Acid	50	ND	50	ND
2-Chlorophenol	10	ND	10	ND
2,4-Dichlorophenol	10	ND	10	ND

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300443-1 Description: MW7/G,P/7

### EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLÄNK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	10 50 50 10 10 10 50 20 50 10 10	ND ND ND ND ND ND ND ND ND	10 ND 50 ND 50° ND 10 ND 10 ND 10 ND 20 ND 50 ND 20 ND 10 ND 10 ND 10 ND 10 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
2-Fluorobiphenyl	34- 99	71	34-99 70
Nitrobenzene-d5	37- 94	69	37-94 64
p-Terphenyl-d14	57- 94	93	57-94 93
2-Fluorophenol	12- 82	24	12-82 25
Phenol-d6	23- 62	53	23-62 49
2,4,6-Tribromophenol	49-102	64	49-102 68

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

Darrell H. Nelson, B.S. Laboratory Director

Darrell H Melson

mlh

February 10, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4
Sample Description: MW8/A/7/1
Sampled by : Abdun-nur/Bricker
Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300444-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity pH	120.1 150.1	umhos/cm2 units	1	1840 7.1

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Daniel H Nelm

Darrell H. Nelson, B.S. Laboratory Director

FGL ENVIRONMENTAL

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

February 10, 1993

LAB No: SP 300444-2

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus, CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/A/ 7/2 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300444-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity pH	120.1 150.1	umhos/cm2 units	1	1850 7.1

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.

ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram

Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Kurt Wilkinson, B.S. Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melon

February 10, 1993

LAB No: SP 300444-3

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus, CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW8/A/ 7/3 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300444-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	1850
pH	150.1	units		7.1

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.

ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram

Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

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FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melm

KW/DHN:mlh

Kurt Wilkinson, B.S. Inorganic Lab Manager

February 10, 1993

LAB No: SP 300444-4

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

22116 W. Soledad Can.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/A/ 7/4 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300444-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1	1840
pH	150.1	units		7.1

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

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Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

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Corporate Offices & Laboratory

Office & Laboratory

Field Office



February 3, 1993

RE: Organic Analyses Lab # SP 300444

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

	1	Batch	7	· F · ·	Grab or	Sampled	_	-	te		Samp. Container	
ID	Number	ID	Description	Туре	Comp.	by	Sampled	Received	Extracted	Analyzed	& Preservatives	TOC
1			QA/QC Blank	Lab. Blank Water					N/A	02/02/93		ND
2	SP 300444-01 SP 300444-02		, , , , , , , , , , , , , , , , , , , ,	Monitoring Well Monitoring Well	1	Abdun-nur/Bricker		· - • - · -		02/02/93	,	ND ND
4	SP 300444-02			Monitoring Well		Abdun-nur/Bricker Abdun-nur/Bricker	01/27/93 01/27/93		N/A N/A	02/02/93 02/02/93	1,2,a 1,2,a	ND ND
5	SP 300444-04	201A	MW8/B/ 7/4	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/02/93	1,2,a	ND

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 0.5 mg/L by EPA Method 415.1

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental

Cor Darrell H. Nelson, B.S. Laboratory Director

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February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 RE: Organic Analyses L

Lab # SP 300444

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

	Sample	Batch	Sample	Sample	Grab or	Sampled		Da	te		Samp. Container	
ID	Number	ID	Description	Туре	Comp.	by	Sampled	Received	Extracted	Analyzed	& Preservatives	TOX
1	19930204 TOX	201A	QA/QC Blank	Lab. Blank Water					N/A	02/04/93		ND
2	SP 300444-01	201A	MW8/C/ 7/1	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	27
3	SP 300444-02	201A	MW8/C/ 7/2	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	30
4	SP 300444-03	201A	MW8/C/ 7/3	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	32
5	SP 300444-04	201A	MW8/C/ 7/4	Monitoring Well	Grab	Abdun-nur/Bricker	01/27/93	01/27/93	N/A	02/04/93	1,2,a	36

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 5 ug/L by EPA Method 9020

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Carell H Nelon

February 10, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker

RE: Inorganic Analysis

22116 W. Soledad Can. Rd. Saugus, CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/H/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300449-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Chloride	300.0	mg/L	1	471
Nitrate	300.0	mg/L		5.4
Sodium	200.7	mg/L	1	69
Sulfate	300.0	mg/L		ND
Iron	6010	mg/L	0.05	0.19
Manganese	6010	mg/L	0.03	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Inorganic Lab Manager

Turkel/elkinson

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

KW/DHN:mlh

February 10, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

.RE: Inorganic Analysis

Saugus, CA 91350

Sampling Site: Bermite 85-01.4
Sample Description: MW8/I/7
Sampled by : Abdun-nur/Bricker
Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Phosphorous, Ortho	365.2	mg/L	0.1	ND	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

twitellie amon

Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

February 10, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW8/N/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Fluoride	340.2	mg/L	0.1	0.2	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Kentuflikuson

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melan

February 11, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/K,M/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

: January 27, 1993 Sampled Received: January 27, 1993 Completed: February 8, 1993 QA/QC ID# : 930208 300423-201M

### Analytical Results - Dissolved

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Antimony	7041	ug/L	100	ND
Arsenic	7060	ug/L	50	ND
Barium	6010	ug/L	100	260
Cadmium	7131	ug/L	10	ND
Chromium	7191	ug/L	50	ND
Copper	6010	ug/L	100	ND
Lead	7421	ug/L	50	ND
Mercury	7470	ug/L	1	ND
Selenium	7740	ug/L	10	ND
Silver	7761	ug/L	10	ND
Thallium	7841	ug/L	1000	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Lustuleikuson Kurt Wilkinson, B.S.

Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

Janell H Ylelson

Laboratory Director



Page 2 of 2

#### Results of Analysis for FGL Environmental

Client Reference: SP300437 Clayton Project No. 93012.62

Sample Matrix/Media: WATER Date Received: 01/29/93
Preparation Method: EPA 8315(Draft) Date Prepared: 02/02/93

Preparation Method: EPA 8315(Draft) Date Prepared: 02/02/93 Analysis Method: EPA 8315(Draft) Date Analyzed: 02/03/93

Lab Number	Id€	Sample entification	Date Sampled	Formaldehyde (ug/L)	Detection Limit (ug/L)
01A	1	MW1	01/27/93	<20	20
02A	2	MW2	01/27/93	<20	20
<b>3</b> 3A	3	MW3	01/27/93	<20	20
04A	4	MW5	01/27/93	<20	20
05A	5	MW6	01/27/93	<20	20
06A	6	MW7	01/27/93	<20	20
<b>07A</b>	7	MW8	01/27/93	<20	20
08A	8	MW9	01/27/93	<20	20
39A	9	MW10	01/27/93	<20	20
10A	MET	THOD BLANK		15 a	20

ND Not detected at or above limit of detection

Not detected at or above limit of detection

⁻⁻ Information not available or not applicable

Actual blank value; sample results have been blank corrected.

February 10, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

LAB No: SP 300444-1

RE: Organic Analysis Matrix: Monitoring Well

Sampling Site: Bermite 85-01.4
Sample Description: MW8/D/7
Sampled by : Abdun-nur/Bricker
Container : Amber Glass TFE-Cap

Preservatives:

Sampled: January 27, 1993
Received: January 27, 1993
Extracted: February 1, 1993
Analyzed: February 4, 1993

QA/QC ID# : 930201 608-202A

#### **EPA METHOD 608**

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Endrin	2.0	ND	0.2 ND
Lindane	2.0	ND	0.2 ND
Methoxychlor	50	ND	5 ND
Toxaphene	50	ND	5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
Hexachlorobenzene	67- 94	72	26-116 85
Dibutylchlorendate	89-146	88	44-125 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

The normal method detection limit has been increased to reflect the fact that a dilution of 10.0x was required to achieve an acceptable chromatogram.

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager Darrell H. Nelson, B.S. Laboratory Director

arrell H Melan

m1h

February 15, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/D/7

Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300444-1

RE: Organic Analysis Matrix: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Extracted: February 2, 1993
Analyzed: February 5, 1993

QA/QC ID# : 930202 615-205A

#### EPA METHOD 615

CONSTITUENT	SAMPLE DLR mg/L	SAMPLE RESULTS mg/L	LAB BLANK DLR RESULTS mg/L mg/L
2,4-D 2,4,5-TP (Silvex)	0.1 0.01	ND ND	0.1 ND 0.01 ND
SURROGATE	SAMPLE AR	SAMPLE % REC.	AR % REC.
2,4-DCAA	30-150	80%	30-150 116%

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) mg/L = Milligrams Per Liter (ppm) ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

arrell H Nelson Darrell H. Nelson, B.S. Laboratory Director

kdm

February 10, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW8/E/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 8, 1993 QA/QC ID# : 930208 300444-201A

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	MCL
Gross Alpha	900.0	pCi/L		6 ± 3	5-35
Gross Beta	900.0	pCi/L		0.3 ± 8	50
Total Radium	900.1	pCi/L		0.7 ± 1	5

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Mutufilasson

Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

anell H Melon

Laboratory Director

February 4, 1993

LAB No: 300444-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350

Sampled by

: Abdun-nur/Bricker

Date Started : January 27, 1993 Date Finished: January 29, 1993

Date Sampled : January 27, 1993

Date Received: January 27, 1993

TEST RESULTS

MW8/F/7

RE: BACTERIOLOGICAL ANALYSIS

Sample

Time

Time

Coliform MPN/100 ml

Fecal. MPN/100 ml

Sample ID Type Sampled Start

> Source 11:29A 03:19P < 1.1 ABSENT

The State Board of Public Health requires that bacteriological results must be "ABSENT" to meet drinking water requirements. Analyses were performed using Standard Methods 17th edition, APHA.

FGL ENVIRONMENTAL

rrh

February 4, 1993

LAB No: SP 300444-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/0/7 Sampled by : Abdun-nur/Bricker Container : Glass TFE-Lined Cap

Sampled : January 27, 1993 Received : January 27, 1993 Extracted : N/A

Preservatives:

Analyzed: February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L	<del></del>
Acetone	10	ND	10 ND	
Benzene	0.5	ND	0.5 ND	
Bromodichloromethane	1	ND	1 ND	
Bromoform	1	ND	1 ND	
Bromomethane	1	ND	<u>1</u> ND	
Carbon Disulfide	5	ND .	5 ND	
Carbon Tetrachloride	0.5	ND	0.5 ND	
Chlorobenzene	0.5	ND	0.5 ND	
Chloroethane	1	ND	1 ND	
Chloroform	0.5	ND	0.5 ND	
Chloromethane	1	ND	1 ND	
Dibromochloromethane	1	ND	1 ND	
1,2-Dichlorobenzene	1	ND	1 ND	
1,3-Dichlorobenzene	1	ND	1 ND	
1,4-Dichlorobenzene	1	ND	1 ND	
1,1-Dichloroethane	1	ND	1 ND	
1,2-Dichloroethane	1	ND	1 ND	
1,1-Dichloroethylene	1	ND	1 ND	
trans-1,2-Dichloroethylene	1	ND	1 ND	
1,2-Dichloropropane	1	ND	1 ND	
cis-1,3-Dichloropropene	2	ND	2 ND	
trans-1,3-Dichloropropene	1	ND	1 ND	
Ethanol	5,000	ND	5,000 ND	

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker LAB No: SP 300444-1 Description: MW8/0/7

### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 1 0.5 0.5 0.5 0.5 1 1.5 100 0.5	ND ND ND ND ND ND ND ND ND ND ND ND	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1 ND 1.5 ND 1.5 ND 100 ND 0.5 ND 100 ND 0.5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	89	61-164 86
Toluene-d8	81-117	99	81-117 96
BFB	62-124	97	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)
ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager Darrell H. Nelson, B.S. Laboratory Director

Daniel H Nelson

kdm

February 9, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW8/G,P/7

Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300444-1

RE: Organic Analysis Matrix: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 3, 1993 Analyzed: February 4, 1993 QA/QC ID#: 930203 625-201A

#### EPA METHOD 625.

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Acenaphthene	10	ND	10 ND
Acenaphthylene	10	ND .	10 ND
Aniline	50	ND	50 ND
Anthracene	10	ND	10 ND
Azobenzene	50	ND	50 ND
Benzidine	50	ND	50 ND
Benzo(a)anthracene	10	ND	10 ND
Benzo(a)pyrene	10	ND [*]	10 ND
Benzo(b)fluoranthene	10	ND	10 ND
Benzo(k)fluoranthene	10	ND	10 ND
Benzo(g,h,i)perylene	10	ND	10 ND
Benzylalcohol	20	ND	20 ND
bis(2-Chloroethoxy)methane	10	ND	10 ND
bis(2-Chloroethyl)ether	10	ND	10 ND
bis(2-Chloroisopropyl)ether	10	ND	10 ND
bis(2-Ethylhexyl)phthalate	10	ND	10 ND
4-Bromophenylphenylether	10	ND	10 ND
Butylbenzylphthalate	10	ND	10 ND
Chloroaniline	10	ND	10 ND
Chloronaphthalene	10	ND	10 ND
Chlorophenylphenylether	10	ND	10 ND
Chrysene	10	ND	10 ND
Dibenzo(a,h)anthracene	10	ND	10 ND

Table cont'd next page ...

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300444-1 Description: MW8/G,P/7

EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Dibenzofuran	10	ND	10	ND
1,2-Dichlorobenzene	10	ND	10	ND
1,3-Dichlorobenzene	10	, ND	10	ND
1,4-Dichlorobenzene	10	ND	10	ND
3,3'-Dichlorobenzidine	20	ND	20	ND
Diethylphthalate	10	ND	10	ND
Dimethylphthalate	10	ND	10	ND
Di-n-butylphthalate	10	ND	10	ND
2,4-Dinitrotoluene	10	ND	10	ND
2,6-Dinitrotoluene	10	ND	10	ND
Di-n-octylphthalate	10	ND	10	ND
Fluoranthene	10	ND	10	ND
Fluorene	10	ND	10	ND
Hexachlorobenzene	10	ND	10	ND
Hexachlorobutadiene	10	ND	10	ИD
Hexachlorocyclopentadiene	10	ND	10	ND
Hexachloroethane	10	ND	10	ND
Indeno(1,2,3-c,d)pyrene	10	ND	10	ND
Isophorone	10	ND	10	ND
2-Methylnaphthalene	10	ND	10	ND
Naphthalene	10	ND	10	ND
Nitrobenzene	10	ND	10	ND
N-Nitrosodimethylamine	10	ND	10	ND
N-Nitrosodi-N-propylamine	10	ND	10	ND
N-Nitrosodiphenylamine	10	ND	10	ND
2-Nitroanaline	50	ND	50	ND
3-Nitroanaline	50	ND	50	ND
4-Nitroanaline	50	ND	50	ND
Phenanthrene	10	ND	10	ND
Pyrene	10	ND	10	ND
1,2,4-Trichlorobenzene	10	ND	10	ND
Benzoic Acid	50	ND	50	ND
2-Chlorophenol	10	ND	10	ND
2,4-Dichlorophenol	10	ND	10	ND

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300444-1 Description: MW8/G,P/7

### EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	10 50 50 10 10 10 50 20 50 10 10	ND ND ND ND ND ND ND ND ND	10 ND 50 ND 50 ND 10 ND 10 ND 10 ND 20 ND 50 ND 10 ND 10 ND 10 ND 10 ND 10 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol	34- 99	75	34-99 70
	37- 94	70	37-94 64
	57- 94	93	57-94 93
	12- 82	25	12-82 25
	23- 62	53	23-62 49
	49-102	68	49-102 68

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Darrell H Melon

Darrell H. Nelson, B.S. Laboratory Director

mlh

February 10, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/A/7/1 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	2770
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S.

Tertulal kikenson

Inorganic Lab Manager

KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H Nelson BS

February 10, 1993

LAB No: SP 300445-2

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW9/A/ 7/2 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	2760
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Mutallanion

KW/DHN:mlh

FGL ENVIRONMENTAL

Oanell H Nelson

February 10, 1993

LAB No: SP 300445-3

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/A/ 7/3 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	2780
pH	150.1	units		6.9

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melson

February 10, 1993

LAB No: SP 300445-4

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/A/ 7/4 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Conductivity	120.1	umhos/cm2	1_	2770
pH	150.1	units		7.0

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

Mistellelanson

KW/DHN:mlh

FGL ENVIRONMENTAL

Oarrell H Melon



February 4, 1993

RE: Organic Analyses

Lab # SP 300445

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus , CA 91350 Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Sample Type	Grab or Comp.	Sampled by	Sampled		te Extracted	Analyzed	Samp. Container & Preservatives	
1 2 3 4 5	19930202 TOC SP 300445-01 SP 300445-02 SP 300445-03 SP 300445-04	201A 201A 201A	MW9/B/ 7/2 MW9/B/ 7/3	Lab. Blank Water Monitoring Well Monitoring Well Monitoring Well Monitoring Well	Grab Grab	Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker	01/27/93	01/27/93 01/27/93 01/27/93 01/27/93	N/A N/A N/A N/A	02/02/93 02/02/93 02/02/93 02/02/93 02/02/93	1,2,a 1,2,a 1,2,a 1,2,a	ND ND ND ND NĐ

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 0.5 mg/L by EPA Method 415.1

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Est Environmentall Malor



February 5, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus, CA 91350 RE: Organic Analyses |

Lab # SP 300445

Sampling Site: Bermite 85-01.4

#### **ANALYTICAL RESULTS**

ID	Sample Number	Batch ID	Sample Description	Sample Type	Grab or Comp.	Sampled by	Sampled		te Extracted	Analyzed	Samp. Container & Preservatives	
-		201A 201A 201A 201A	QA/QC Blank MW9/C/ 7/1 MW9/C/ 7/2 MW9/C/ 7/3	Lab. Blank Water Monitoring Well Monitoring Well Monitoring Well Monitoring Well	Grab Grab Grab	Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker Abdun-nur/Bricker	01/27/93 01/27/93 01/27/93	01/27/93 01/27/93 01/27/93 01/27/93	N/A N/A N/A N/A	02/04/93 02/04/93		ND 58 76 60 66

Preservatives: (1) Cool 4°C (2) H2SO4 pH < 2 Containers: (a) Amber Glass TFE-Cap

ND = Not Detected at a DLR of 5 ug/L by EPA Method 9020

If you have any questions Please call.

H. Neal Hutchison, B.S.

Organic Laboratory Manager

FGL Environmental H Nelson

February 10, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW9/H/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled: January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300449-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
Chloride	300.0	mg/L	1	746
Nitrate	300.0	mg/L	0.5	5.4
Sodium	200.7	mg/L	1	66
Sulfate	300.0	mg/L	1	9
Iron	6010	mg/L	0.05	0.10
Manganese	6010	mg/L	0.03	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

arrell H Melson

Laboratory Director

February 10, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW9/I/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 5, 1993 QA/QC ID# : 930205 300445-2011

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Phosphorous, Ortho	365.2	mg/L	0.1	ND	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR.
ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram
Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

Laboratory Director

arrell H Nelson

February 10, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/N/7 Sampled by : Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Completed: February 5, 1993 QA/QC ID# : 930205 300445-201I

### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	
Fluoride	340.2	mg/L	0.1	0.1	

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

arrell H Melon

February 11, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Inorganic Analysis

Saugus, CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/K,M/7 Sampled by: Abdun-nur/Bricker Type of Sample: Monitoring Well

Sampled : January 27, 1993 Received : January 27, 1993 Completed : February 8, 1993 QA/QC ID# : 930208 300423-201M

### Analytical Results - Dissolved

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS
CONSTITUENT	ווב ו חטט	011112	DER	KESULIS
Antimony	7041	ug/L	100	ND
Arsenic	7060	ug/L	50	ND
Barium	6010	ug/L	100	330
Cadmium	7131	ug/L	10	ND
Chromium	7191	ug/L	50	ND
Copper	6010	ug/L	100	ND
Lead	7421	ug/L	50	ND
Mercury	7470	ug/L	1	ND
Selenium	7740	ug/L	10	ND
Silver	7761	ug/L	10	ND
Thallium	7841	ug/L	1000	ND

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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Darrell H. Nelson, B.S. Laboratory Director

FGL ENVIRONMENTAL

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KW/DHN:mlh



Page 2 of 2

#### Results of Analysis for FGL Environmental

Client Reference: SP300437 Clayton Project No. 93012.62

Sample Matrix/Media: WATER

Date Received: 01/29/93

02/02/93

Preparation Method: EPA 8315(Draft) Analysis Method: EPA 8315 (Draft)

Date Prepared: Date Analyzed:

02/03/93

Lab Number	Ide	Sample entification	Date Sampled	Formaldehyde (ug/L)	Detection Limit (ug/L)
01A	1	MW1	01/27/93	<20	20
02A	2	MW2	01/27/93	<20	20
03A	3	MW3	01/27/93	<20	20
04A	4	MW5	01/27/93	<20	20
05A	5	MW6	01/27/93	<20	20
<b>06A</b>	6	MW7	01/27/93	<20	20
<b>07A</b>	7	MW8	01/27/93	<20	20
08A	8	MW9	01/27/93	<20	20
09A	9	MW10	01/27/93	<20	20
10A	ME	THOD BLANK	′	15 ^a	20

Not detected at or above limit of detection ND

Not detected at or above limit of detection <

Information not available or not applicable

Actual blank value; sample results have been blank corrected.

February 10, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus, CA 91350

LAB No: SP 300445-1

RE: Organic Analysis

Matrix: Monitoring Well

Sampling Site: Bermite 85-01.4 Sample Description: MW9/D/7 Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

: January 27, 1993 Sampled Received: January 27, 1993 Extracted: February 1, 1993 Analyzed: February 4, 1993

QA/QC ID# : 930201 608-202A

#### EPA METHOD 608

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Endrin	2.0	ND	0.2 ND
Lindane	2.0	ND	0.2 ND
Methoxychlor	50	ND	5 ND
Toxaphene	50	ND	5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
Hexachlorobenzene	67- 94	94	26-116 85
Dibutylchlorendate	89-146	122	44-125 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range

The normal method detection limit has been increased to reflect the fact that a dilution of 10.0x was required to achieve an acceptable chromatogram.

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Jarrell H Nelson

Darrell H. Nelson, B.S. Laboratory Director

mlh

February 15, 1993

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus, CA 91350

Sampling Site: Bermite 85-01.4

Sample Description: MW9/D/7 Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Preservatives:

LAB No: SP 300445-1

RE: Organic Analysis Matrix: Monitoring Well

Sampled : January 27, 1993 Received: January 27, 1993 Extracted: February 2, 1993 Analyzed: February 5, 1993

QA/QC ID# : 930202 615-205A

#### EPA METHOD 615

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	mg/L	mg/L	mg/L mg/L
2,4-D	0.1	ND	0.1 ND
2,4,5-TP (Silvex)	0.01	ND	0.01 ND
SURROGATE	SAMPLE AR	SAMPLE % REC.	AR % REC.
2,4-DCAA	30-150	190%	30-150 116%

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) mg/L = Milligrams Per Liter (ppm) ND = Not Detected at or above the DLR. AR = Acceptable Range

Note: * Surrogate recovery is out of spec due to matrix interference.

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S. Organic Laboratory Manager

Darrell H. Nelson, B.S. Laboratory Director

arrell H Nelson

kdm

February 10, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker

22116 W. Soledad Can. Rd. Saugus , CA 91350

RE: Inorganic Analysis

Sampling Site: Bermite 85-01.4 Sample Description: MW9/E/7 Sampled by : Abdun-nur/Bricker

Sampled: January 27, 1993 Received: January 27, 1993 Completed: February 8, 1993

Type of Sample: Monitoring Well Completed: February 8, 1993 QA/QC ID#: 930208 300445-201A

#### Analytical Results

CONSTITUENT	EPA METHOD	UNITS	DLR	RESULTS	MCL
Gross Alpha	900.0	pCi/L		5 ± 3	5-35
Gross Beta	900.0	pCi/L		4 ± 8	50
Total Radium	900.1	pCi/L		0.5 ± 1	5

DLR = Detection Limit for Reporting Purposes. ND = Not Detected at or above the DLR. ug/L = Micrograms Per Liter (ppb) mg/L = Milligrams Per Liter (ppm) mg/kg = Milligrams Per Kilogram Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions please call.

Kurt Wilkinson, B.S. Inorganic Lab Manager

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KW/DHN:mlh

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S.

arrell H Melon

Laboratory Director

February 4, 1993

LAB No: 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd. Saugus, CA 91350

Sampled by

: Abdun-nur/Bricker

Date Started : January 27, 1993

Date Finished: January 29, 1993

Standard Methods 17th edition, APHA.

Date Sampled : January 27, 1993 Date Received: January 27, 1993

TEST RESULTS

RE: BACTERIOLOGICAL ANALYSIS

Sample ID

Sample

Time Time Sampled

Coliform

Fecal

Type

Start

MPN/100 ml

MPN/100 ml

MW9/F/7

Source

11:56A

03:20P < 1.1 ABSENT

The State Board of Public Health requires that bacteriological results must be "ABSENT" to meet drinking water requirements. Analyses were performed using

FGL ENVIRONMENTAL

rrh

Raguel R. Harvey

February 4, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

Saugus , CA 91350

RE: Organic Analysis Matrix: Monitoring Well

Sampling Site: Bermite 85-01.4
Sample Description: MW9/0/7
Sampled by: Abdun-nur/Bricker
Container: Glass TFE-Lined Cap

Preservatives:

Sampled: January 27, 1993 Received: January 27, 1993

Extracted: N/A

Analyzed : February 3, 1993 QA/QC ID# : 930203 624-202A

#### EPA METHOD 624

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Acetone	10	ND	10 ND
Benzene	0.5	ND	0.5 ND
Bromodichloromethane	1	ND	<b>1</b> ND
Bromoform	1	ND	1 ND
Bromomethane	1	ND	1 ND
Carbon Disulfide	5	ND	5 ND
Carbon Tetrachloride	0.5	ND	0.5 ND
Chlorobenzene	0.5	ND	0.5 ND
Chloroethane	1	ND	1 ND
Chloroform	0.5	ND	0.5 ND
Chloromethane	1	ND	1 ND
Dibromochloromethane	1	ND	1 ND
1,2-Dichlorobenzene	1	ND	1 ND
1,3-Dichlorobenzene	1	DИ	1 ND
1,4-Dichlorobenzene	1	ND	1 ND
1,1-Dichloroethane	1	ND	1 ND
1,2-Dichloroethane	1	ND	1 ND
1,1-Dichloroethylene	1	ND	1 ND
trans-1,2-Dichloroethylene	1	ND	1 ND
1,2-Dichloropropane	1	ND	1 ND
cis-1,3-Dichloropropene	2	ND	2 ND
trans-1,3-Dichloropropene	1	ND	1 ND
Ethanol	5,000	ND	5,000 ND

Table cont'd next page ...

February 4, 1993 Bermite Division of Whittaker

LAB No: SP 300445-1 Description: MW9/0/7

### EPA METHOD 624 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULTS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
Ethyl Benzene 2-Hexanone Methylene Chloride 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) Styrene 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl Acetate Vinyl Chloride Xylenes	0.5 5 0.5 10 5 1 0.5 0.5 0.5 0.5 1.5 100 0.5	ND ND ND ND ND ND ND ND ND ND ND	0.5 ND 5 ND 0.5 ND 10 ND 5 ND 1 ND 1 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 0.5 ND 1 ND 1.5 ND 1.5 ND 1.5 ND 1.5 ND 1.5 ND 1.5 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
1,2-Dichloroethane-d4	61-164	80	61-164 86
Toluene-d8	81-117	99	81-117 96
BFB	62-124	98	62-124 98

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Daniel H Nelson

Darrell H. Nelson, B.S. Laboratory Director

kdm

February 9, 1993

LAB No: SP 300445-1

Bermite Division of Whittaker 22116 W. Soledad Can. Rd.

RE: Organic Analysis Matrix: Monitoring Well

Saugus , CA 91350

Sampling Site: Bermite 85-01.4 Sample Description: MW9/G,P/7 Sampled by : Abdun-nur/Bricker Container : Amber Glass TFE-Cap

Sampled: January 27, 1993 Received: January 27, 1993 Extracted: February 3, 1993 Analyzed: February 5, 1993

Preservatives:

QA/QC ID# : 930203 625-201A

#### EPA METHOD 625

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Acenaphthene	10	ND	10	ND
Acenaphthylene	10	ND	10	ND
Aniline	50	ND	50	ND
Anthracene	10	ND	10	ND
Azobenzene	50	ND	50	ND
Benzidine	50	ND	50	ND
Benzo(a)anthracene	10	ND	10	ND
Benzo(a)pyrene	10	ND	10	ND
Benzo(b)fluoranthene	10	ND	10	ND
Benzo(k)fluoranthene	10	ND	10	ND
Benzo(g,h,i)perylene	10	ND	10	ND
Benzylalcohol	20	ND	20	ND
bis(2-Chloroethoxy)methane	10	ND	10	ND
bis(2-Chloroethyl)ether	10	ND	10	ND
bis(2-Chloroisopropyl)ether	10	ND	10	ND
bis(2-Ethylhexyl)phthalate	10	ND	10	ND
4-Bromophenylphenylether	10	ND	10	ND
Butylbenzylphthalate	10	ND	10	ND
Chloroaniline	10	ND	10	ND
Chloronaphthalene	10	ND	10	ND
Chlorophenylphenylether	10	ND	10	ND
Chrysene	10	ND	10	ND
Dibenzo(a,h)anthracene	10	ND	10	ND

Table cont'd next page ...

LAB No: SP 300445-1 Description: MW9/G,P/7

### EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE DLR ug/L	SAMPLE RESULTS ug/L		AB BLANK R RESULTS /L ug/L
Dibenzofuran	10	ND	10	D ND
1,2-Dichlorobenzene	10	ND	10	D ND
1,3-Dichlorobenzene	10	ND	1	GN C
1,4-Dichlorobenzene	10	ND	1	O ND
3,3'-Dichlorobenzidine	20	ND	2	D ND
Diethylphthalate	10	ND	1	O ND
Dimethylphthalate	10	ND	1	0 ND
Di-n-butylphthalate	10	ND	1	0 ND
2,4-Dinitrotoluene	10	ND	1	O ND
2,6-Dinitrotoluene	10	ND	1	O ND
Di-n-octylphthalate	10	ND	1	O ND
Fluoranthene	10	ND	1	O ND
Fluorene	10	ND	1	O ND
Hexachlorobenzene	10	ND	1	O ND
Hexachlorobutadiene	10	ND	1	O ND
Hexachlorocyclopentadiene	10	ND	1	O ND
Hexachloroethane	10	ND	1	O ND
Indeno(1,2,3-c,d)pyrene	10	ND	1	O ND
Isophorone	10	ND	1	O ND
2-Methylnaphthalene	10	ND	1	O ND
Naphthalene	10	ND	1	O ND
Nitrobenzene	10	ND	1	O ND
N-Nitrosodimethylamine	10	ND	1	0 ND
N-Nitrosodi-N-propylamine	10	ND	1	O ND
N-Nitrosodiphenylamine	10	ND	. 1	O ND
2-Nitroanaline	50	ND	5	O ND
3-Nitroanaline	50	ND	5	O ND
4-Nitroanaline	50	ND	5	O ND
Phenanthrene	10	ND	]	O ND
Pyrene	10	ND	]	O ND
1,2,4-Trichlorobenzene	10	ND	]	O ND
Benzoic Acid	50	ND	į	SO ND
2-Chlorophenol	. 10	ND		.O ND
2,4-Dichlorophenol	10	ND	]	O ND

February 9, 1993 Bermite Division of Whittaker LAB No: SP 300445-1 Description: MW9/G,P/7

### EPA METHOD 625 Analysis results Cont'd

CONSTITUENT	SAMPLE	SAMPLE	LAB BLANK
	DLR	RESULITS	DLR RESULTS
	ug/L	ug/L	ug/L ug/L
2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 4-Nitrophenol p-Chloro-m-cresol Pentachlorophenol Phenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	10 50 50 10 10 10 50 20 50 10	ND ND ND ND ND ND ND ND ND	10 ND 50 ND 50 ND 10 ND 10 ND 10 ND 20 ND 50 ND 10 ND 10 ND 10 ND 10 ND
SURROGATES	SAMPLE	SAMPLE	LAB BLANK
	AR	% REC.	AR % REC.
2-Fluorobiphenyl Nitrobenzene-d5 p-Terphenyl-d14 2-Fluorophenol Phenol-d6 2,4,6-Tribromophenol	34- 99	57	34-99 70
	37- 94	55	37-94 64
	57- 94	80	57-94 93
	12- 82	10*	12-82 25
	23- 62	21*	23-62 49
	49-102	70	49-102 68

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)

ug/L = Micrograms Per Liter (ppb)

ND = Not Detected at or above the DLR. AR = Acceptable Range

Note: *Surrogate recovery is below acceptance range; however, all other QC criteria were met.

See attached report for QA/QC data. If you have any questions please call.

FGL ENVIRONMENTAL

H. Neal Hutchison, B.S.

Organic Laboratory Manager

Daniel H Meloon

Darrell H. Nelson, B.S. Laboratory Director

mlh

# APPENDIX H STATISTICAL ANALYSES OF INDICATOR PARAMETERS

TABLE H-1

REPLICATE STATISTICS FOR SEVENTH SAMPLING EVENT
AREA 342 RCRA GROUNDWATER SAMPLING AND ANALYSIS
Bermite Division, Whittaker Corporation

Well	Date	pН	Hydrogen Ion Conc	Conductance (umhos/cm)	TOC (mg/l)	TOX (ug/l)
Detection	Limit				0.5	5
100.5	01/07/02	7.4	2.005.00	7/7	0.25	10
MW-7	01/27/93	7.4	3.98E-08	767	0.25	10
MW-7	01/27/93	7.4	3.98E-08	767	0.25	9
MW-7	01/27/93	7.4	3.98E-08	771	0.25	17
MW-7	01/27/93	7.4	3.98E-08	775	0.25	18
Population	n Size	4	4	4	4	4
Mean		7.400	3.98E-08	770.000	0.250	13.500
Standard 2	Deviation	0.000	0.00E + 00	3.830	0.000	4.655
Variance		0.000	0.00E + 00	14.667	0.000	21.667
Coeff. Va	riance	0.000	0.00E+00	0.497	0.000	34.480
***********				*		
MW-2	01/27/93	6.9	1.26E-07	4150	0.25	96
MW-2	01/27/93	6.9	1.26E-07	4170	0.25	100
MW-2	01/27/93	6.9	1.26E-07	4170	0.25	93
MW-2	01/27/93	6.8	1.58E-07	4190	0.25	110
Population	n Size	4	4	4	4	4
Mean		6.875	1.34E-07	4170.000	0.250	99.750
Standard 1	Deviation	0.050	1.63E-08	16.330	0.000	7.411
Variance		0.003	2.66E-16	266.667	0.000	54.917
Coeff. Va	riance	0.727	1.22E+01	0.392	0.000	7.429

TABLE H-1, Page 2

REPLICATE STATISTICS FOR SEVENTH SAMPLING EVENT

AREA 342 RCRA GROUNDWATER SAMPLING AND ANALYSIS

Bermite Division, Whittaker Corporation

Well	Date	pН	Hydrogen Ion Conc	Conductance (umhos/cm)	TOC (mg/l)	TOX (ug/l)
Detection	Limit				0.5	5
MW-8	01/27/93	7.1	7.94E-08	1840	0.25	27
<b>MW-</b> 8	01/27/93	7.1	7.94E-08	1850	0.25	30
MW-8	01/27/93	7.1	7.94E-08	1850	0.25	32
MW-8	01/27/93	7.1	7.94E-08	1840	0.25	36
Populatio	n Size	4	4	4	4	4
Mean		7.100	7.94E-08	1845.000	0.250	31.250
Standard	Deviation	0.000	0.00E + 00	5.774	0.000	3.775
Variance		0.000	0.00E+00	33.333	0.000	14.250
Coeff. Va	riance	0.000	0.00E+00	0.313	0.000	12.080
MW-9	01/27/93	6.9	1.26E-07	2770	0.25	58
MW-9	01/27/93	6.9	1.26E-07	2760	0.25	76
MW-9	01/27/93	6.9	1.26E-07	2780	0.25	60
MW-9	01/27/93	7.0	1.00E-07	2770	0.25	66
Populatio	n Size	4	4	4	4	4
Mean		6.925	1.19E-07	2770.000	0.250	65.000
	Deviation	0.050	1.29E-08	8.165	0.000	8.083
Variance		0.002	1.68E-16	66.667	0.000	65.333
Coeff. Va	riance	0.722	1.08E+01	0.295	0.000	12.435

Note:

All results reported as non-detected have been given a value equal to one-half the detection limit for purposes of statistical calculations, as recommended on page 122 of the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, September 1986.

TABLE H-2

SUMMARY OF REPLICATE STATISTICS FOR

TOTAL ORGANIC CARBON (TOC)

Bermite Division, Whittaker Corporation

Well	Event	Number of Replicates	Mean	Standard Deviation	Variance	Coeff. of Variance
MW-2	1	4	7.53	1.791	3.209	23.806
	2	4	2.70	1.944	3.779	71.012
	3	4	3.93	0.741	0.549	18.880
	4	4	0.25	0.000	0.000	0.000
	5	4	2.50	3.051	9.308	120.825
	6	4	1.16	1.825	3.331	156.989
	7	4	0.25	0.000	0.000	0.000
MW-7	1	4	0.54	0.197	0.390	36.722
	2	4	0.25	0.000	0.000	0.000
	3	4	0.25	0.000	0.000	0.000
	4	4	0.25	0.000	0.000	0.000
	5	4	0.25	0.000	0.000	0.000
	6	4	0.25	0.000	0.000	0.000
	7	4	0.25	0.000	0.000	0.000
MW-8	1	4	0.84	0.403	0.162	48.102
	2	4	1.33	0.544	0.296	41.049
	3	4	1.95	0.370	0.137	18.958
	4	4	1.64	1.018	1.036	62.147
	5	4	0.25	0.000	0.000	0.000
	6	4	0.25	0.000	0.000	0.000
	7	4	0.25	0.000	0.000	0.000
<b>MW-</b> 9	1	4	1.45	1.121	1.257	77.311
	2	4	1.35	1.286	1.655	95.294
	3	4	2.95	0.436	0.190	14.776
	4	4	3.70	0.872	0.760	23.562
	5	4	0.37	0.245	0.060	65.772
	6	4	0.25	0.000	0.000	0.000
	7	4	0.25	0.000	0.000	0.000

### TABLE H-2, PAGE 2

## SUMMARY OF REPLICATE STATISTICS FOR TOTAL ORGANIC CARBON (TOC)

Background Variance (Sb2)  MW-2, Event 7  Number of Samples (nm)  Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  Special Weighting (Wm)  Special Weighting (Wb)  T-Statistic (t*)  Comparison T-Statistic (tc)  MW-8, Event 7  Number of Samples (nm)  Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)	
Background Mean Background Variance (Sb2)  MW-2, Event 7  Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV) Special Weighting (Wm) Special Weighting (Wb) T-Statistic (t*) Comparison T-Statistic (tc)  MW-8, Event 7  Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV)	
Number of Samples (nm)  Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)  Special Weighting (Wm)  Special Weighting (Wb)  T-Statistic (t*)  Comparison T-Statistic (tc)  MW-8, Event 7  Number of Samples (nm)  Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)	7 .291 .012
Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)  Special Weighting (Wm)  Special Weighting (Wb)  T-Statistic (t*)  Comparison T-Statistic (tc)  MW-8, Event 7  Number of Samples (nm)  Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tb) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)	
Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV)	4 0.250 0.000 0.353 0.000 0.002 1.000 0.943
Sample Mean (Xm)  Sample Variance (Sm2)  T-Statistic (tm) (Part 264, App. IV)  T-Statistic (tb) (Part 264, App. IV)	
T-Statistic (t*)	4 0.250 0.000 2.353 1.943 0.000 0.002 1.000 1.943

### TABLE H-2, PAGE 3

## SUMMARY OF REPLICATE STATISTICS FOR TOTAL ORGANIC CARBON (TOC)

Bermite Division, Whittaker Corporation

6	
MW-9, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	0.250
Sample Variance (Sm2)	0.000
T-Statistic (tm) (Part 264, App. IV)	2.353
T-Statistic (tb) (Part 264, App. IV)	1.943
Special Weighting (Wm)	0.000
Special Weighting (Wb)	0.002
T-Statistic (t*)	-1.000
Comparison T-Statistic (tc)	1.943
- ' '	

#### NOTES:

The statistics in this table are defined in 40 CFR Part 264, App. IV--Cochran's Approximation to the Behrens-Fisher Students' T-Test.

All values less than the detection limits have been given values equal to one-half the detection limits for purposes of calculation, as recommended on page 122 of the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, September 1986.

TABLE H-3

## SUMMARY OF REPLICATE STATISTICS FOR TOTAL ORGANIC HALOGENS (TOX)

Well	Event	Number of Replicates	Mean	Standard Deviation	Variance	Coeff. of Variance
MW-2	1	4	72	8.083	64.607	11.164
	2	4	77	7.750	60.060	10.052
	3	4	55	15.643	244.696	28.249
	4	4	78	5.377	28.917	6.872
	5	4	72	36.967	1366.523	51.253
	6	4	84	2.986	8.917	3.565
	7	4	99.75	7.411	54.917	7.429
MW-7	1	4	9	2.127	4.522	24.235
	2	4	6	0.403	0.162	7.041
	3	4	4	2.179	4.750	51.281
	4	4	5	2.949	8.697	58.396
	5	4	17	15.691	246.209	93.26
	6	4	11	5.058	25.583	44.96
	7	4	13.5	4.655	21.667	34.48
MW-8	1	4	55	9.425	88.833	17.013
	2	4	39	5.665	32.089	14.572
	3	4	33	3.567	12.727	10.943
	4	4	37	4.621	21.349	12.463
	5	4	43	7.982	63.709	18.36
	6	4	40	3.697	13.667	9.128
	7	4	31.25	3.775	14.25	12.08
MW-9	1	4	56	4.878	23.797	8.719
	2	4	51	6.221	38.696	12.085
	3	4	45	5.480	30.029	12.104
	4	4	62	8.102	65.649	13.011
	5	4	79	8.175	66.823	10.403
	6	4	67	13.301	176.917	19.927
	7	4	65	8.083	65.333	12.435

### TABLE H-3, PAGE 2

## SUMMARY OF REPLICATE STATISTICS FOR TOTAL ORGANIC HALOGENS (TOX)

Background Well 7	
Number of Background Samples (nb) Background Mean Background Variance (Sb2)	7 9.339 22.447
MW-2, Event 7	
Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV) Special Weighting (Wm) Special Weighting (Wb) T-Statistic (t*) Comparison T-Statistic (tc)	4 99.750 54.917 2.353 1.943 13.729 3.207 21.969 2.275
MW-8, Event 7	
Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV) Special Weighting (Wm) Special Weighting (Wb) T-Statistic (t*) Comparison T-Statistic (tc)	4 31.250 14.250 2.353 1.943 3.563 3.207 8.422 2.159

### TABLE H-3, PAGE 3

## SUMMARY OF REPLICATE STATISTICS FOR TOTAL ORGANIC HALOGENS (TOX)

Bermite Division, Whittaker Corporation

MW-9, Event 7	
Number of Samples (nm) Sample Mean (Xm) Sample Variance (Sm2) T-Statistic (tm) (Part 264, App. IV) T-Statistic (tb) (Part 264, App. IV) Special Weighting (Wm) Special Weighting (Wb)	4 65.000 65.333 2.353 1.943 16.333 3.207
T-Statistic (t*) Comparison T-Statistic (tc)	12.592 2.286

#### NOTES:

The statistics in this table are defined in 40 CFR Part 264, App. IV--Cochran's Approximation to the Behrens-Fisher Students' T-Test.

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TABLE H-4

## SUMMARY OF REPLICATE STATISTICS FOR SPECIFIC CONDUCTANCE

Well	Event	Number of Replicates	Mean	Standard Deviation	Variance	Coeff. of Variance
MW-2	1	4	4030	0.000	0.000	0.000
1,1,,	2	4	4060	0.000	0.000	0.000
	3	4	3925	5.774	33.333	0.147
	4	4	4100	0.000	0.000	0.000
	5	4	4150	0.000	0.000	0.000
	6	4	4075	10.000	100.000	0.245
	7	4	4170	16.33	266.667	0.392
MW-7	1	4	727	5.058	25.583	0.695
	2	4	736	0.957	0.917	0.130
	3	4	736	1.414	2.000	0.192
	4	4	740	2.754	7.583	0.372
	5	4	753	5.000	25.000	0.664
	6	4	783	4.163	17.330	0.532
	7	4	770	3.83	14.667	0.497
MW-8	1	4	2132	5.000	25.000	0.234
	2	4	2085	10.000	100.000	0.480
	3	4	2012	67.020	4491.667	3.330
	4	4	2102	17.078	291.667	0.812
	5	4	2088	9.574	91.667	0.459
	6	4	2050	18.257	333.333	0.891
	7	4	1845	5.774	33.333	0.313
MW-9	1	4	2767	9.574	91.667	0.346
	2	4	2785	5.774	33.333	0.207
	3	4	2767	5.000	25.000	0.181
	4	4	2765	5.774	33.333	0.209
	5	4	2800	0.000	0.000	0.000
	6	4	2805	10.000	100.000	0.357
	7	4	2770	8.165	66.667	0.295

### TABLE H-4, PAGE 2

## SUMMARY OF REPLICATE STATISTICS FOR SPECIFIC CONDUCTANCE

Background Well 7	
Number of Background Samples (nb)	7
Background Mean	749.000
Background Variance (Sb2)	423.333
MW-2, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	4170.000
Sample Variance (Sm2)	266.667
T-Statistic (tm) (Part 264, App. IV)	2.353
T-Statistic (tb) (Part 264, App. IV)	1.943
Special Weighting (Wm)	66.667
Special Weighting (Wb)	60.476
T-Statistic (t*)	303.394
Comparison T-Statistic (tc)	2.158
MW-8, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	1845.000
Sample Variance (Sm2)	33.333
T-Statistic (tm) (Part 264, App. IV)	2.353
T-Statistic (tb) (Part 264, App. IV)	1.943
Special Weighting (Wm)	8.333
Special Weighting (Wb)	60.476
T-Statistic (t*)	132.125
Comparison T-Statistic (tc)	1.993

### TABLE H-4, PAGE 3

## SUMMARY OF REPLICATE STATISTICS FOR SPECIFIC CONDUCTANCE

### Bermite Division, Whittaker Corporation

MW-9, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	2770.000
Sample Variance (Sm2)	66.667
T-Statistic (tm) (Part 264, App. IV)	2.353
T-Statistic (tb) (Part 264, App. IV)	1.943
Special Weighting (Wm)	16.667
Special Weighting (Wb)	60.476
T-Statistic (t*)	230.101
Comparison T-Statistic (tc)	2.032

#### **NOTES:**

The statistics in this table are defined in 40 CFR Part 264, App. IV--Cochran's Approximation to the Behrens-Fisher Students' T-Test.

All values less than the detection limits have been given values equal to one-half the detection limits for purposes of calculation, as recommended on page 122 of the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, September 1986.

TABLE H-5

SUMMARY OF REPLICATE STATISTICS FOR
HYDROGEN ION CONCENTRATION ((10) ^-pH)
Bermite Division, Whittaker Corporation

Well	Event	Number of Replicates	Mean	Standard Deviation	Variance	Coeff. of Variance
MW-2	1	4	1.58E-07	0.00E + 00	0.00E+00	0.0
	2	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	3	4	1.89E-07	2.05E-08	4.21E-16	10.8
	4	4	1.58E-07	0.00E + 00	0.00E + 00	0.0
	5	4	1.58E-07	0.00E + 00	0.00E + 00	0.0
	6	4	1.58E-07	0.00E + 00	0.00E + 00	0.0
	7	4	1.34E-07	1.63E-08	2.66E-16	12.2
MW-7	1	4	6.31E-08	0.00E + 00	0.00E + 00	0.0
	2	4	5.01E-08	0.00E + 00	0.00E + 00	0.0
	3	4	5.66E-08	7.49E-09	5.61E-17	13.2
	4	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	5	4	5.01E-08	0.00E + 00	0.00E + 00	0.0
	6	4	5.01E-08	0.00E + 00	0.00E + 00	0.0
	7	4	3.98E-08	0.00E + 00	0.00E + 00	0.0
MW-8	1	4	1.06E-07	1.29E-08	1.68E-16	12.2
	2	4	8.46E-08	1.03E-08	1.06E-16	12.2
	3	4	1.06E-07	1.29E-08	1.68E-16	12.2
	4	4	1.19E-07	1.29E-08	1.68E-16	10.8
	5	4	1.00E-07	0.00E + 00	0.00E + 00	0.0
	6	4	1.00E-07	0.00E + 00	0.00E + 00	0.0
	7	4	7.94E-08	0.00E + 00	0.00E + 00	0.0
<b>MW-</b> 9	1	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	2	4	1.00E-07	0.00E + 00	0.00E + 00	0.0
	3	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	4	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	5	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	6	4	1.26E-07	0.00E + 00	0.00E + 00	0.0
	7	4	1.19E-07	1.29E-08	1.68E-16	10.8

## TABLE H-5, PAGE 2

## SUMMARY OF REPLICATE STATISTICS FOR HYDROGEN ION CONCENTRATION

Background Well 7	
Number of Background Samples (nb) Background Mean	7 6.23E-08
Background Variance (Sb2)	8.41E-16
MW-2, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	1.34E-07
Sample Variance (Sm2)	2.66E-16
T-Statistic (tm) (Part 264, App. IV)	3.182
T-Statistic (tb) (Part 264, App. IV)	2.447
Special Weighting (Wm)	0.000
Special Weighting (Wb)	0.000
T-Statistic (t*)	5.252
Comparison T-Statistic (tc)	2.709
MW-8, Event 7	
Number of Samples (nm)	4
Sample Mean (Xm)	7.94E-08
Sample Variance (Sm2)	0.00E+00
T-Statistic (tm) (Part 264, App. IV)	3.182
T-Statistic (tb) (Part 264, App. IV)	2.447
Special Weighting (Wm)	0.000
Special Weighting (Wb)	0.000
T-Statistic (t*)	1.564
Comparison T-Statistic (tc)	2.447

### TABLE H-5, PAGE 3

## SUMMARY OF REPLICATE STATISTICS FOR HYDROGEN ION CONCENTRATION

### Bermite Division, Whittaker Corporation

#### NOTES:

The statistics in this table are defined in 40 CFR Part 264, App. IV--Cochran's Approximation to the Behrens-Fisher Students' T-Test.

All values less than the detection limits have been given values equal to one-half the detection limits for purposes of calculation, as recommended on page 122 of the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, September 1986.